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### 1.0.1 ISRO2007-69 [top](#)



A rule in a limited entry decision table is a

- A. row of the table consisting of condition entries
- B. row of the table consisting of action entries
- C. column of the table consisting of condition entries and the corresponding action entries
- D. columns of the table consisting of conditions of the stub

isro2007 algorithms

[Answer key](#)

## 1.1

### Algorithm Design Techniques (1) [top](#)



#### 1.1.1 Algorithm Design Techniques: ISRO2018-16 [top](#)

The following paradigm can be used to find the solution of the problem in minimum time:

Given a set of non-negative integer and a value  $K$ , determine if there is a subset of the given set with sum equal to  $K$ :

- |                       |                        |
|-----------------------|------------------------|
| a. Divide and Conquer | b. Dynamic Programming |
| c. Greedy Algorithm   | d. Branch and Bound    |

isro2018 algorithm-design-techniques algorithms

[Answer key](#)

## 1.2

### Binary Search (2) [top](#)



#### 1.2.1 Binary Search: ISRO2007-59 [top](#)

The time taken by binary search algorithm to search a key in a sorted array of  $n$  elements is

- |                    |             |
|--------------------|-------------|
| A. $O(\log_2 n)$   | B. $O(n)$   |
| C. $O(n \log_2 n)$ | D. $O(n^2)$ |

isro2007 algorithms binary-search

[Answer key](#)



#### 1.2.2 Binary Search: ISRO2014-28 [top](#)

Suppose there are 11 items in sorted order in an array. How many searches are required on the average, if binary search is employed and all searches are successful in finding the item?

- A. 3.00
- B. 3.46
- C. 2.81

## D. 3.33

algorithms binary-search isro2014

Answer key 

1.3

Breadth First Search (2) 

### 1.3.1 Breadth First Search: ISRO2017-17



Which of the following data structure is useful in traversing a given graph by breadth first search?

- A. Stack
- B. Queue
- C. List
- D. None of the above

isro2017 data-structures graph-algorithms breadth-first-search easy

Answer key 

### 1.3.2 Breadth First Search: ISRO2018-33



Which of the following is application of Breadth First Search on the graph?

- A. Finding diameter of the graph
- B. Finding bipartite graph
- C. Both (a) and (b)
- D. None of the above

isro2018 graph-algorithms breadth-first-search algorithms

Answer key 

1.4

Dijkstras Algorithm (1) 

### 1.4.1 Dijkstras Algorithm: ISRO2007-80



Dijkstra's algorithm is used to

- A. Create LSAs
- B. Flood an internet with information
- C. Calculate the routing tables
- D. Create a link state database

isro2007 algorithms graph-algorithms shortest-path dijkstras-algorithm

Answer key 

1.5

Graph Algorithms (2) 

### 1.5.1 Graph Algorithms: GATE CSE 1998 | Question: 1.21, ISRO2008-16



Which one of the following algorithm design techniques is used in finding all pairs of shortest distances in a graph?

- A. Dynamic programming
- B. Backtracking
- C. Greedy
- D. Divide and Conquer

gate1998 algorithms graph-algorithms easy isro2008

Answer key 

## 1.5.2 Graph Algorithms: ISRO2017-76 [top](#)



Which of the following algorithms solves the all pair shortest path problem?

- A. Prim's algorithm
- B. Dijkstra's algorithm
- C. Bellman ford algorithm
- D. Floyd warshalls algorithm

isro2017 algorithms graph-algorithms

Answer key

1.6

Hashing (1) [top](#)



### 1.6.1 Hashing: ISRO2018-36 [top](#)

A hash table with 10 buckets with one slot per bucket is depicted here. The symbols,  $S1$  to  $S7$  are initially entered using a hashing function with linear probing. The maximum number of comparisons needed in searching an item that is not present is

0	$S7$
1	$S1$
2	
3	$S4$
4	$S2$
5	
6	$S5$
7	
8	$S6$
9	$S3$

- a. 4
- b. 5
- c. 6
- d. 3

isro2018 algorithms hashing

Answer key

1.7

Huffman Code (1) [top](#)



### 1.7.1 Huffman Code: ISRO2020-34 [top](#)

Huffman tree is constructed for the following data :{ $A, B, C, D, E$ } with frequency {0.17, 0.11, 0.24, 0.33 and 0.15} respectively. 100 00 01101 is decoded as

- A.  $BACE$
- B.  $CADE$
- C.  $BAD$
- D.  $CADD$

isro-2020 algorithms huffman-code normal

Answer key

1.8

Identify Function (5) [top](#)



### 1.8.1 Identify Function: ISRO2007-23 [top](#)



Study the following program

```
//precondition: x>=0
public void demo(int x)
{
    System.out.print(x % 10);
    if (x % 10 != 0)
    {
        demo(x/10);
    }
    System.out.print(x%10);
}
```

Which of the following is printed as a result of the call `demo (1234)`?

- A. 1441      B. 3443      C. 12344321      D. 43211234

isro2007 algorithms identify-function

[Answer key](#)



### 1.8.2 Identify Function: ISRO2008-69 [top](#)

What is the value of  $F(4)$  using the following procedure:

```
function F(K : integer)
integer;
begin
if (k<3) then F:=k else F:=F(k-1)*F(k-2)+F(k-3)
end;
```

- A. 5      B. 6      C. 7      D. 8

isro2008 algorithms recursion identify-function

[Answer key](#)



### 1.8.3 Identify Function: ISRO2011-40 [top](#)



Consider the following pseudocode

```
x:=1;
i:=1;
while ( x ≤ 500)
begin
x:=2x;
i:=i+1;
end
```

What is the value of  $i$  at the end of the pseudocode?

- A. 4      B. 5      C. 6      D. 7

isro2011 algorithms identify-function

[Answer key](#)

#### 1.8.4 Identify Function: ISRO2018-12 [top](#)



An array  $A$  consists of  $n$  integers in locations  $A[0], A[1], \dots, A[n - 1]$ . It is required to shift the elements of the array cyclically to the left by  $k$  places, where  $1 \leq k \leq (n - 1)$ . An incomplete algorithm for doing this in linear time, without using another array is given below. Complete the algorithm by filling in the blanks.

```
min=n; i=0;
while(_____) {
    temp=A[i]; j=i;
    while(_____) {
        A[j]=_____;
        j=(j+k) mod n;
        if(j<min) then
            min = j;
    }
    A[(n+i-k) mod n]=_____;
    i=_____;
}
```

- a.  $i > \min; j! = (n + 1) \bmod n; A[j + k] \quad \text{temp}; i + 1;$
- b.  $i < \min; j! = (n + i) \bmod n; A[j + k] \quad \text{temp}; i + 1;$
- c.  $i > \min; j! = (n + i + k) \bmod n; A[j + k] \quad \text{temp}; i + 1;$
- d.  $i < \min; j! = (n + i - k) \bmod n; A[(j + k) \bmod n] \quad \text{temp}; i + 1;$

isro2018 algorithms identify-function

Answer key [\[Q\]](#)

#### 1.8.5 Identify Function: ISRO2018-7 [top](#)



Assume  $A$  and  $B$  are non-zero positive integers. The following code segment:

```
while(A!=B){
    if*(A> B)
        A -= B;
    else
        B -= A;
}
cout<<A; // printing the value of A
```

- a. Computes the  $LCM$  of two numbers
- b. Divides the larger number by the smaller number
- c. Computes the  $GCD$  of two numbers
- d. Finds the smaller of two numbers

isro2018 algorithms identify-function

Answer key [\[Q\]](#)

### 1.9

#### Master Theorem (1) [top](#)



##### 1.9.1 Master Theorem: ISRO2020-21 [top](#)

The master theorem

- A. assumes the subproblems are unequal sizes

- B. can be used if the subproblems are of equal size
- C. cannot be used for divide and conquer algorithms
- D. cannot be used for asymptotic complexity analysis

isro-2020    algorithms    master-theorem    easy

[Answer key](#)

1.10

## Matrix Chain Ordering (1) [top](#)



### 1.10.1 Matrix Chain Ordering: ISRO2020-79 [top](#)

Consider product of three matrices  $M_1$ ,  $M_2$  and  $M_3$  having  $w$  rows and  $x$  columns,  $x$  rows and  $y$  columns, and  $y$  rows and  $z$  columns. Under what condition will it take less time to compute the product as  $(M_1 M_2) M_3$  than to compute  $M_1 (M_2 M_3)$ ?

- A. Always take the same time
- B.  $(1/x + 1/z) < (1/w + 1/y)$
- C.  $x > y$
- D.  $(w + x) > (y + z)$

isro-2020    algorithms    matrix-chain-ordering    normal

[Answer key](#)

1.11

## Merge Sort (2) [top](#)



### 1.11.1 Merge Sort: ISRO2007-58 [top](#)

The average case and worst case complexities for Merge sort algorithm are

- A.  $O(n^2), O(n^2)$
- B.  $O(n^2), O(n \log_2 n)$
- C.  $O(n \log_2 n), O(n^2)$
- D.  $O(n \log_2 n), O(n \log_2 n)$

isro2007    algorithms    sorting    merge-sort

[Answer key](#)



### 1.11.2 Merge Sort: ISRO2011-66 [top](#)

Which of the following algorithm design technique is used in merge sort?

- A. Greedy method
- B. Backtracking
- C. Dynamic programming
- D. Divide and Conquer

isro2011    algorithms    sorting    merge-sort

[Answer key](#)

1.12

## P Np Npc Nph (1) [top](#)



### 1.12.1 P Np Npc Nph: GATE CSE 2004 | Question: 30, ISRO2017-10 [top](#)

The problem 3-SAT and 2-SAT are

- A. both in P
- B. both NP complete
- C. NP-complete and in P respectively
- D. undecidable and NP complete respectively

gatecse-2004    algorithms    p-np-npc-nph    easy    isro2017    out-of-gate-syllabus

[Answer key](#)

**1.13****Quick Sort (1)** [top](#)**1.13.1 Quick Sort: GATE CSE 1994 | Question: 1.19, ISRO2016-31** [top](#)

Algorithm design technique used in quicksort algorithm is?

- A. Dynamic programming
- B. Backtracking
- C. Divide and conquer
- D. Greedy method

gate1994 algorithms sorting quick-sort easy isro2016

[Answer key](#)

**1.14****Recurrence Relation (4)** [top](#)**1.14.1 Recurrence Relation: GATE CSE 1994 | Question: 1.7, ISRO2017-14** [top](#)

The recurrence relation that arises in relation with the complexity of binary search is:

- A.  $T(n) = 2T\left(\frac{n}{2}\right) + k$ , k is a constant
- B.  $T(n) = T\left(\frac{n}{2}\right) + k$ , k is a constant
- C.  $T(n) = T\left(\frac{n}{2}\right) + \log n$
- D.  $T(n) = T\left(\frac{n}{2}\right) + n$

gate1994 algorithms recurrence-relation easy isro2017

[Answer key](#)

**1.14.2 Recurrence Relation: GATE CSE 2004 | Question: 83, ISRO2015-40** [top](#)

The time complexity of the following C function is (assume  $n > 0$ )

```
int recursive (int n) {
    if(n == 1)
        return (1);
    else
        return (recursive (n-1) + recursive (n-1));
}
```

- A.  $O(n)$
- B.  $O(n \log n)$
- C.  $O(n^2)$
- D.  $O(2^n)$

gatecse-2004 algorithms recurrence-relation time-complexity normal isro2015

[Answer key](#)

**1.14.3 Recurrence Relation: GATE CSE 2006 | Question: 51, ISRO2016-34** [top](#)

Consider the following recurrence:

$$T(n) = 2T(\sqrt{n}) + 1, T(1) = 1$$

Which one of the following is true?

- A.  $T(n) = \Theta(\log \log n)$
- B.  $T(n) = \Theta(\log n)$
- C.  $T(n) = \Theta(\sqrt{n})$
- D.  $T(n) = \Theta(n)$

algorithms recurrence-relation isro2016 gatecse-2006

[Answer key](#)

#### 1.14.4 Recurrence Relation: ISRO2011-56 [top](#)



Let  $T(n)$  be defined by  $T(1) = 10$  and  $T(n+1) = 2n + T(n)$  for all integers  $n \geq 1$ . Which of the following represents the order of growth of  $T(n)$  as a function of  $n$ ?

- A.  $O(n)$
- B.  $O(n \log n)$
- C.  $O(n^2)$
- D.  $O(n^3)$

isro2011 algorithms time-complexity recurrence-relation

[Answer key](#)

#### 1.15

#### Relations (1) [top](#)



#### 1.15.1 Relations: ISRO2017-80 [top](#)

The time complexity of computing the transitive closure of a binary relation on a set of  $n$  elements is known to be

- a.  $O(n \log n)$
- b.  $O(n^{3/2})$
- c.  $O(n^3)$
- d.  $O(n)$

isro2017 relations algorithms time-complexity

[Answer key](#)

#### 1.16

#### Searching (1) [top](#)



#### 1.16.1 Searching: GATE CSE 1996 | Question: 2.13, ISRO2016-28 [top](#)

The average number of key comparisons required for a successful search for sequential search on  $n$  items is

- A.  $\frac{n}{2}$
- B.  $\frac{n-1}{2}$
- C.  $\frac{n+1}{2}$
- D. None of the above

gate1996 algorithms easy isro2016 searching

[Answer key](#)

#### 1.17

#### Selection Sort (1) [top](#)



#### 1.17.1 Selection Sort: ISRO2008-77 [top](#)

How many comparisons are needed to sort an array of length 5 if a straight selection sort is used and array is already in the opposite order?

- A. 1
- B. 10
- C. 15
- D. 20

isro2008 algorithms sorting selection-sort

[Answer key](#)

**1.18.1 Sorting: GATE CSE 1999 | Question: 1.14, ISRO2015-42 [top](#)**

If one uses straight two-way merge sort algorithm to sort the following elements in ascending order:

20, 47, 15, 8, 9, 4, 40, 30, 12, 17

then the order of these elements after second pass of the algorithm is:

- A. 8, 9, 15, 20, 47, 4, 12, 17, 30, 40
- B. 8, 15, 20, 47, 4, 9, 30, 40, 12, 17
- C. 15, 20, 47, 4, 8, 9, 12, 30, 40, 17
- D. 4, 8, 9, 15, 20, 47, 12, 17, 30, 40

[gate1999](#) [algorithms](#) [sorting](#) [normal](#) [isro2015](#)

[Answer key](#)

**1.18.2 Sorting: GATE CSE 2006 | Question: 14, ISRO2011-14 [top](#)**

Which one of the following in place sorting algorithms needs the minimum number of swaps?

- A. Quick sort
- B. Insertion sort
- C. Selection sort
- D. Heap sort

[gatetcse-2006](#) [algorithms](#) [sorting](#) [easy](#) [isro2011](#)

[Answer key](#)

**1.18.3 Sorting: ISRO2007-55 [top](#)**

Selection sort algorithm design technique is an example of

- |                        |                       |
|------------------------|-----------------------|
| A. Greedy method       | B. Divide-and-conquer |
| C. Dynamic Programming | D. Backtracking       |

[isro2007](#) [algorithms](#) [sorting](#)

[Answer key](#)

**1.18.4 Sorting: ISRO2014-62 [top](#)**

Consider the following sorting algorithms.

- I. Quicksort
- II. Heapsort
- III. Mergesort

Which of them perform in least time in the worst case?

- A. I and II only
- B. II and III only
- C. III only
- D. I, II and III

[isro2014](#) [algorithms](#) [sorting](#)

[Answer key](#)

### 1.18.5 Sorting: ISRO2017-15 [top](#)



Which one of the following in-place sorting algorithms needs the minimum number of swaps?

- A. Insertion Sort
- B. Quick Sort
- C. Heap Sort
- D. Selection Sort

isro2017 algorithms sorting

[Answer key](#)

### 1.18.6 Sorting: ISRO2017-49 [top](#)



The number of swappings needed to sort the numbers 8 , 22, 7, 9, 31, 5, 13 in ascending order using bubble sort is

- A. 11
- B. 12
- C. 13
- D. 10

isro2017 algorithms sorting

[Answer key](#)

### 1.18.7 Sorting: ISRO2018-35 [top](#)



Given two sorted list of size  $m$  and  $n$  respectively. The number of comparisons needed the worst case by the merge sort algorithm will be:

- a.  $m \times n$
- b. maximum of  $m$  and minimum of  $m$  add  $m + n - 1$

isro2018 sorting algorithms

[Answer key](#)

### 1.18.8 Sorting: ISRO2018-66 [top](#)



Of the following sorting algorithms, which has a running time that is least dependent on the initial ordering of the input?

- a. Mege Sort
- b. Insertion Sort
- c. Selection Sort
- d. Quick Sort

isro2018 algorithms sorting

[Answer key](#)

### 1.18.9 Sorting: ISRO2020-33 [top](#)



If an array  $A$  contains the items 10, 4, 7, 23, 67, 12 and 5 in that order, what will be the resultant array  $A$  after third pass of insertion sort?

- A. 67,12,10,5,4,7,23
- B. 4,7,10,23,67,12,5
- C. 4,5,7,67,10,12,23
- D. 10,7,4,67,23,12,5

isro-2020 algorithms sorting normal

[Answer key](#)

### 1.18.10 Sorting: ISRO2020-65 [top](#)



Of the following sort algorithms, which has execution time that is least dependant on initial ordering of the input?

- A. Insertion sort    B. Quick sort    C. Merge sort    D. Selection sort

isro-2020    algorithms    sorting    normal

Answer key 

1.19

### Spanning Tree (1)

#### 1.19.1 Spanning Tree: ISRO2015-41



The number of spanning trees for a complete graph with seven vertices is

- A.  $2^5$     B.  $7^5$     C.  $3^5$     D.  $2^{2 \times 5}$

isro2015    graph-theory    spanning-tree

Answer key 

1.20

### Time Complexity (6)

#### 1.20.1 Time Complexity: GATE CSE 2007 | Question: 15, ISRO2016-26



Consider the following segment of C-code:

```
int j, n;
j = 1;
while (j <= n)
    j = j * 2;
```

The number of comparisons made in the execution of the loop for any  $n > 0$  is:

- A.  $\lceil \log_2 n \rceil + 1$     B.  $n$   
C.  $\lceil \log_2 n \rceil$     D.  $\lfloor \log_2 n \rfloor + 1$

gatecse-2007    algorithms    time-complexity    normal    isro2016

Answer key 

#### 1.20.2 Time Complexity: ISRO2014-67



What is the time complexity for the following C module? Assume that  $n > 0$ .

```
int module(int n)
{
    if (n == 1)
        return 1;
    else
        return (n + module(n-1));
}
```

- A.  $O(n)$     B.  $O(\log n)$     C.  $O(n^2)$     D.  $O(n!)$

isro2014    algorithms    time-complexity

Answer key 

#### 1.20.3 Time Complexity: ISRO2015-12



A machine needs a minimum of 100 sec to sort 1000 names by quick sort. The minimum time needed to sort 100 names will be approximately

- A. 50.2 sec      B. 6.7 sec      C. 72.7 sec      D. 11.2 sec

isro2015 algorithms time-complexity

Answer key 

#### 1.20.4 Time Complexity: ISRO2018-37 [top](#)

The running time of an algorithm is given by:

$$T(n) = \begin{cases} T(n-1) + T(n-2) - T(n-3), & \text{if } n > 3 \\ n, & \text{otherwise} \end{cases}$$

Then what should be the relation between  $T(1)$ ,  $T(2)$ ,  $T(3)$ , so that the order of the algorithm is constant?

- a.  $T(1) = T(2) = T(3)$       b.  $T(1) + T(3) = 2T(2)$   
c.  $T(1) - T(3) = T(2)$       d.  $T(1) + T(2) = T(3)$

isro2018 algorithms time-complexity

Answer key 

#### 1.20.5 Time Complexity: ISRO2018-72 [top](#)

Consider the following C code segment

```
int f(int x)
{
    if(x<1) return 1;
    else return (if(x-1)+g(x));
}
int g(int x)
{
    if(x<2) return 2;
    else return (if(x-1)+g(x/2));
}
```

Of the following, which best describes the growth of  $f(x)$  as a function of  $x$  ?

- a. Linear      b. Exponential      c. Quadratic      d. Cubic

isro2018 algorithms time-complexity

Answer key 

#### 1.20.6 Time Complexity: ISRO2020-36 [top](#)

What is the complexity of the following code?

```
sum=0;
for(i=1;i<=n;i*=2)
    for(j=1;j<=n;j++)
        sum++;
```

Which of the following is not a valid string?

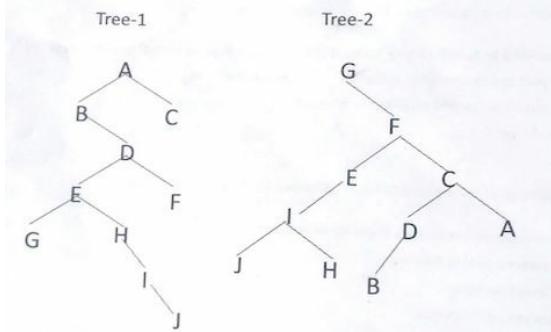
- A.  $O(n^2)$       B.  $O(n \log n)$       C.  $O(n)$       D.  $O(n \log n \log n)$

isro-2020 algorithms time-complexity normal

Answer key 

1.21.1 Tree Traversal: ISRO2018-80 [top](#)

If Tree-1 and Tree-2 are the trees indicated below :



Which traversals of *Tree – 1* and *Tree – 2*, respectively, will produce the same sequence?

- a. Preorder, postorder
- b. Postorder, inorder
- c. Postorder, preorder
- d. Inorder, preorder

[isro2018 tree-traversal algorithms](#)

[Answer key](#)

## Answer Keys

1.0.1	C	1.1.1	B	1.2.1	A	1.2.2	A	1.3.1	B
1.3.2	C	1.4.1	C	1.5.1	A	1.5.2	D	1.6.1	B
1.7.1	A	1.8.1	D	1.8.2	A	1.8.3	B	1.8.4	D
1.8.5	C	1.9.1	B	1.10.1	B	1.11.1	D	1.11.2	D
1.12.1	C	1.13.1	C	1.14.1	B	1.14.2	D	1.14.3	B
1.14.4	C	1.15.1	C	1.16.1	C	1.17.1	B	1.18.1	B
1.18.2	C	1.18.3	X	1.18.4	B	1.18.5	D	1.18.6	D
1.18.7	D	1.18.8	A	1.18.9	B	1.18.10	C	1.19.1	B
1.20.1	X	1.20.2	A	1.20.3	B	1.20.4	X	1.20.5	B
1.20.6	X	1.21.1	X						



## 2.1

8085 Microprocessor (6) top2.1.1 8085 Microprocessor: ISRO2008-39 top

Consider the following Assembly language program

MVIA 30 H  
ACI 30 H  
XRA A  
POP H

After the execution of the above program, the contents of the accumulator will be

- A. 30 H
- B. 60 H
- C. 00 H
- D. contents of stack

isro2008 8085-microprocessor non-gate

**Answer key**

2.1.2 8085 Microprocessor: ISRO2008-45 top

The TRAP is one of the interrupts available in INTEL 8085. Which one of the following statements is true of TRAP ?

- A. it is level triggered
- B. it is negative edge triggered
- C. it is +ve edge triggered
- D. it is both +ve and -ve edges triggered

isro2008 co-and-architecture 8085-microprocessor non-gate

**Answer key**

2.1.3 8085 Microprocessor: ISRO2012-ECE 8085 processor top

The complement Accumulator (CMA) instruction in 8085 processor on execution affects

- a)Zero flag
- b) Sign flag
- c) Overflow flag
- d) none of the above

isro2012-ece isro-ece co-and-architecture 8085-microprocessor

2.1.4 8085 Microprocessor: ISRO2012-ECE: Computer Architecture top

The register in 8085 that is used to keep track of the memory address of the next opcode to be run in the program is the:

- a) Stack Pointer
- b) Program Counter

c) Accumulator

d) Non of the above

isro-ece co-and-architecture isro2012-ece 8085-microprocessor

Answer key 

### 2.1.5 8085 Microprocessor: ISRO2015-61 [top](#)



The contents of the flag register after execution of the following program by 8085 microprocessor will be

Program

SUB A

MVI B,(01)<sub>H</sub>

DCR B

HLT

- A. (54)<sub>H</sub>      B. (00)<sub>H</sub>      C. (01)<sub>H</sub>      D. (45)<sub>H</sub>

8085-microprocessor non-gate isro2015

Answer key 

### 2.1.6 8085 Microprocessor: ISRO2017-20 [top](#)



Which interrupt in 8085 Microprocessor is unmaskable?

- A. RST 5.5      B. RST 7.5      C. TRAP      D. Both (a) and (b)

isro2017 8085-microprocessor non-gate

Answer key 

## 2.2

### Addressing Modes (9) [top](#)



#### 2.2.1 Addressing Modes: GATE CSE 1996 | Question: 1.16, ISRO2016-42 [top](#)

Relative mode of addressing is most relevant to writing:

- |                   |                                |
|-------------------|--------------------------------|
| A. Co – routines  | B. Position – independent code |
| C. Shareable code | D. Interrupt Handlers          |

gate1996 co-and-architecture addressing-modes easy isro2016

Answer key 



#### 2.2.2 Addressing Modes: GATE CSE 2008 | Question: 33, ISRO2009-80 [top](#)



Which of the following is/are true of the auto-increment addressing mode?

- I. It is useful in creating self-relocating code
- II. If it is included in an Instruction Set Architecture, then an additional ALU is required for effective address calculation
- III. The amount of increment depends on the size of the data item accessed

- A. I only      B. II only      C. III only      D. II and III only

gatecse-2008 addressing-modes co-and-architecture normal isro2009

Answer key 

### 2.2.3 Addressing Modes: GATE IT 2006 | Question: 39, ISRO2009-42



Which of the following statements about relative addressing mode is FALSE?

- A. It enables reduced instruction size
- B. It allows indexing of array element with same instruction
- C. It enables easy relocation of data
- D. It enables faster address calculation than absolute addressing

gateit-2006 co-and-architecture addressing-modes normal isro2009

Answer key 

### 2.2.4 Addressing Modes: ISRO2009-21, UGCNET-Dec2012-II: 12



In which addressing mode, the effective address of the operand is generated by adding a constant value to the content of a register?

- A. Absolute mode
- B. Indirect mode
- C. Immediate mode
- D. Index mode

isro2009 co-and-architecture ugcnetcse-dec2012-paper2 addressing-modes

Answer key 

### 2.2.5 Addressing Modes: ISRO2011-5



MOV [BX], AL type of data addressing is called ?

- A. register
- B. immediate
- C. register indirect
- D. register relative

isro2011 co-and-architecture addressing-modes

Answer key 

### 2.2.6 Addressing Modes: ISRO2017-19



The most appropriate matching for the following pairs :

- |                              |                |
|------------------------------|----------------|
| X. Indirect Addressing       | i. Loop        |
| Y. Immediate Addressing      | ii. Pointers   |
| Z. Auto Decrement Addressing | iii. Constants |
- 
- |                     |                     |
|---------------------|---------------------|
| A. X-iii, Y-ii, Z-i | B. X-ii, Y-iii, Z-i |
| C. X-iii, Y-i, Z-ii | D. X-ii, Y-i, Z-iii |

isro2017 co-and-architecture addressing-modes

Answer key 

## 2.2.7 Addressing Modes: ISRO2020-1 [top](#)



The immediate addressing mode can be used for

1. Loading internal registers with initial values
2. Perform arithmetic or logical operation on data contained in instructions

Which of the following is true?

- |                 |   |
|-----------------|---|
| A. Only 1       | B. Only 2                                 |
| C. Both 1 and 2 | D. Immediate mode refers to data in cache |

isro-2020 co-and-architecture normal addressing-modes

[Answer key](#)

## 2.2.8 Addressing Modes: ISRO2020-15 [top](#)



A stack organized computer is characterised by instructions with

- |                        |                      |
|------------------------|----------------------|
| A. indirect addressing | B. direct addressing |
| C. zero addressing     | D. index addressing  |

isro-2020 co-and-architecture addressing-modes normal

[Answer key](#)

## 2.2.9 Addressing Modes: ISRO2020-8 [top](#)



Consider a 32-bit processor which supports 70 instructions. Each instruction is 32 bit long and has 4 fields namely opcode, two register identifiers and an immediate operand of unsigned integer type. Maximum value of the immediate operand that can be supported by the processor is 8191. How many registers the processor has?

- A. 32      B. 64      C. 128      D. 16

isro-2020 co-and-architecture addressing-modes normal

[Answer key](#)

## 2.3

## Cache Memory (7) [top](#)



### 2.3.1 Cache Memory: GATE CSE 2001 | Question: 1.7, ISRO2008-18 [top](#)

More than one word are put in one cache block to:

- |  |   |
|--|---|
| A. exploit the temporal locality of reference in a program | B. exploit the spatial locality of reference in a program |
| C. reduce the miss penalty                                 | D. none of the above                                      |

gatecse-2001 co-and-architecture easy cache-memory isro2008

[Answer key](#)

### 2.3.2 Cache Memory: GATE IT 2004 | Question: 12, ISRO2016-77 [top](#)



Consider a system with 2 level cache. Access times of Level 1 cache, Level 2 cache and main memory are 1 ns, 10 ns, and 500 ns respectively. The hit rates of Level 1 and Level 2 caches are 0.8 and 0.9, respectively. What is the average access time of the

system ignoring the search time within the cache?

- A. 13.0      B. 12.8      C. 12.6      D. 12.4

gateit-2004    co-and-architecture    cache-memory    normal    isro2016

[Answer key](#) 

### 2.3.3 Cache Memory: ISRO2007-14 [top](#)

The principal of the locality of reference justifies the use of

- A. virtual memory    B. interrupts    C. main memory    D. cache memory

isro2007    co-and-architecture    cache-memory

[Answer key](#) 

### 2.3.4 Cache Memory: ISRO2007-46 [top](#)

Consider a small 2-way set-associative cache memory, consisting of four blocks. For choosing the block to be replaced, use the least recently (LRU) scheme. The number of cache misses for the following sequence of block addresses is 8, 12, 0, 12, 8

- A. 2      B. 3      C. 4      D. 5

isro2007    co-and-architecture    cache-memory

[Answer key](#) 

### 2.3.5 Cache Memory: ISRO2017-21 [top](#)

A cache memory needs an access time of 30 ns and main memory 150 ns, what is average access time of CPU (assume hit ratio = 80%)?

- A. 60 ns      B. 30 ns      C. 150 ns      D. 70 ns

isro2017    co-and-architecture    cache-memory

[Answer key](#) 

### 2.3.6 Cache Memory: ISRO2018-73 [top](#)

For a multi-processor architecture, in which protocol a write transaction is forwarded to only those processors that are known to possess a copy of newly altered cache line?

- a. Snoopy bus protocol  
c. Directory based protocol
- b. Cache coherency protocol  
d. None of the above

isro2018    cache-memory

[Answer key](#) 

### 2.3.7 Cache Memory: ISRO2020-43 [top](#)

Which of the following is an efficient method of cache updating?

- A. Snoopy writes  
C. Write within
- B. Write through  
D. Buffered write

**Answer key****2.4****Co And Architecture (24)****2.4.1 Co And Architecture: GATE CSE 1998 | Question: 2.10, ISRO2008-17**

The address space of 8086 CPU is

- A. one Megabyte
- B. 256 Kilobytes
- C. 1 K Megabytes
- D. 64 Kilobytes

**Answer key****2.4.2 Co And Architecture: ISRO2007-08**

A read bit can be read

- A. and written by CPU
- B. and written by peripheral
- C. by peripheral and written by CPU
- D. by CPU and written by the peripheral

**Answer key****2.4.3 Co And Architecture: ISRO2007-53**

In the Big-Endian system, the computer stores

- A. MSB of data in the lowest memory address of data unit
- B. LSB of data in the lowest memory address of data unit
- C. MSB of data in the highest memory address of data unit
- D. LSB of data in the highest memory address of data unit

**Answer key****2.4.4 Co And Architecture: ISRO2008-37**

The ability to temporarily halt the CPU and use this time to send information on buses is called

- A. direct memory access
- B. vectoring the interrupt
- C. polling
- D. cycle stealing

**Answer key****2.4.5 Co And Architecture: ISRO2008-42**

Which of the following architecture is/are not suitable for realising SIMD?

- A. Vector processor
- B. Array processor

C. Von Neumann

D. All of the above

isro2008 co-and-architecture

Answer key 

#### 2.4.6 Co And Architecture: ISRO2008-55 [top](#)

The Memory Address Register

- A. is a hardware memory device which denotes the location of the current instruction being executed.
- B. is a group of electrical ckt, that performs the intent of instructions fetched from memory
- C. contains the address of the memory location that is to be read from or stored into
- D. contains a copy of the designated memory location specified by the MAR after a "read" or the new contents of the memory prior to a "write"

isro2008 co-and-architecture

Answer key 

#### 2.4.7 Co And Architecture: ISRO2009-34 [top](#)

The microinstructions stored in the control memory of a processor have a width of 26 bits. Each microinstruction is divided into three fields. a micro operation field of 13 bits, a next address field (X), and a MUX select field (Y). There are 8 status bits in the inputs of the MUX. How many bits are there in the X and Y fields, and what is the size of the control memory in number of words?

- A. 10, 3, 1024
- B. 8, 5, 256
- C. 5, 8, 2048
- D. 10, 3, 512

isro2009 co-and-architecture

Answer key 

#### 2.4.8 Co And Architecture: ISRO2009-79 [top](#)

Compared to CISC processors,RISC processors contain

- A. More register and smaller instruction set
- B. larger instruction set
- C. less registers and smaller instruction set
- D. more transistor elements

isro2009 co-and-architecture

Answer key 

#### 2.4.9 Co And Architecture: ISRO2011-16 [top](#)

Consider a direct mapped cache with 64 blocks and a block size of 16 bytes. To what block number does the byte address 1206 map to

- A. does not map
- B. 6
- C. 11
- D. 54

isro2011 co-and-architecture

[Answer key](#)

#### 2.4.10 Co And Architecture: ISRO2011-37 [top](#)



Find the memory address of the next instruction executed by the microprocessor (8086), when operated in real mode for CS=1000 and IP=E000

- A. 10E00
- B. 1E000
- C. F000
- D. 1000E

isro2011 co-and-architecture non-gate 8086

[Answer key](#)

#### 2.4.11 Co And Architecture: ISRO2011-41 [top](#)



If a microcomputer operates at 5 MHz with an 8-bit bus and a newer version operates at 20 MHz with a 32-bit bus, the maximum speed-up possible approximately will be

- A. 2
- B. 4
- C. 8
- D. 16

isro2011 co-and-architecture

[Answer key](#)

#### 2.4.12 Co And Architecture: ISRO2011-42 [top](#)



The search concept used in associative memory is

- A. Parallel search
- B. Sequential search
- C. Binary search
- D. Selection search

isro2011 co-and-architecture

[Answer key](#)

#### 2.4.13 Co And Architecture: ISRO2012-ECE Computer Architecture [top](#)



Principle of "locality" is used in context of

- a. Addressing lowest Memory address by microprocessor
- b. Addressing Highest Memory.address by microprocessor
- c. Accessing Cache memory locations.
- d. None of above.

co-and-architecture isro2012-ece

#### 2.4.14 Co And Architecture: ISRO2012-ECE Computer architecture [top](#)



Minimum number of bits required to represent maximum value of an analog signal with accuracy of 0.1% is

- a) 8 bits
- b) 9 bits

c) 10 bits

d) 12 bits

co-and-architecture    isro-ece    isro2012-ece

#### 2.4.15 Co And Architecture: ISRO2012-ECE Number system [top](#)



If  $(146)_x + (313)_{x-2} = (246)_8$  then the value of  $x$  will be

a) 5

b) 6

c) 7

d) 9

isro-ece    isro2012-ece    co-and-architecture

[Answer key](#) 

#### 2.4.16 Co And Architecture: ISRO2013-ECE 2s compliment number [top](#)



The two numbers represented in signed 2s complement form are P= 11101101 and Q= 11100110. If Q is subtracted from P, the value obtained in signed 2s complement form is:

a) 1000001111

b) 00000111

c) 11111001

d) 111111001

isro-ece    isro2013-ece    co-and-architecture

[Answer key](#) 

#### 2.4.17 Co And Architecture: ISRO2013-ECE Computer architecture [top](#)



A memory system of size 16 K bytes is required to be designed using memory chips which have 12 address lines and 4 data lines each. The number of such chips required to design the system is:

a) 2

b) 4

c) 8

d) 16

isro-ece    isro2013-ece    co-and-architecture

#### 2.4.18 Co And Architecture: ISRO2014-10 [top](#)



The number of logical CPUs in a computer having two physical quad-core chips with hyper threading enabled is \_\_\_\_\_

- A. 1
- B. 2
- C. 8
- D. 16

co-and-architecture isro2014 non-gate

[Answer key](#)

#### 2.4.19 Co And Architecture: ISRO2014-40 [top](#)



Assume that 16-bit CPU is trying to access a double word starting at an odd address. How many memory operations are required to access the data?

- A. 1
- B. 2
- C. 3
- D. 4

isro2014 co-and-architecture

[Answer key](#)

#### 2.4.20 Co And Architecture: ISRO2016-24 [top](#)



In which class of Flynn's taxonomy, Von Neumann architecture belongs to?

- A. SISD
- B. SIMD
- C. MIMD
- D. MISD

co-and-architecture isro2016

[Answer key](#)

#### 2.4.21 Co And Architecture: ISRO2018-6 [top](#)



A data driven machine is one that executes an instruction if the needed data is available. The physical ordering of the code listing does not dictate the course of execution. Consider the following pseudo-code:

- A. Multiply  $E$  by 0.5 to get  $F$
- C. Add  $B$  with 0.5 to get  $D$
- E. Add  $A$  with 10.5 to get  $C$

- B. Add  $A$  and  $B$  to get  $E$
- D. Add  $E$  and  $F$  to get  $G$

Assume  $A, B, C$  are already assigned values and the desired output is  $G$ . Which of the following sequence of execution is valid?

- a. B, C, D, A, E
- c. A, B, C, D, E

- b. C, B, E, A, D
- d. E, D, C, B, A

isro2018 co-and-architecture

[Answer key](#)

#### 2.4.22 Co And Architecture: ISRO2020-2 [top](#)



Statements associated with registers of a CPU are given. Identify the false statement.

- A. The program counter holds the memory address of the instruction in execution
- B. Only opcode is transferred to the control unit
- C. An instruction in the instruction register consists of the opcode and the operand
- D. The value of the program counter is incremented by 1 once its value has been read to the memory address register

**Answer key****2.4.23 Co And Architecture: ISRO2020-3**

Which of the following affects the processing power assuming they do not influence each other

1. Data bus capability
  2. Address scheme
  3. Clock speed
- A. 3 only      B. 1 and 3 only      C. 2 and 3 only      D. 1,2 and 3

**Answer key****2.4.24 Co And Architecture: ISRO2020-5**

An array of 2 two byte integers is stored in big endian machine in byte addresses as shown below. What will be its storage pattern in little endian machine ?

Address	Data
0 × 104	78
0 × 103	56
0 × 102	34
0 × 101	12

A.

Address	Data
0 × 104	12
0 × 103	56
0 × 102	34
0 × 101	78

B.

Address	Data
0 × 104	12
0 × 103	34
0 × 102	56
0 × 101	78

C.

Address	Data
$0 \times 104$	56
$0 \times 103$	78
$0 \times 102$	12
$0 \times 101$	34

Address	Data
$0 \times 104$	56
D. $0 \times 103$	12
$0 \times 102$	78
$0 \times 101$	34

isro-2020 co-and-architecture normal

Answer key 

## 2.5

### Direct Mapping (1)

#### 2.5.1 Direct Mapping: ISRO2020-47



How many total bits are required for a direct-mapped cache with 128 KB of data and 1 word block size, assuming a 32-bit address and 1 word size of 4 bytes?

- A. 2 Mbits
- B. 1.7 Mbits
- C. 2.5 Mbits
- D. 1.5 Mbits

isro-2020 co-and-architecture cache-memory direct-mapping normal

Answer key 

## 2.6

### Disk (1)

#### 2.6.1 Disk: ISRO2020-46



A magnetic disk has 100 cylinders, each with 10 tracks of 10 sectors. If each sector contains 128 bytes, what is the maximum capacity of the disk in kilobytes?

- A. 1,280,000
- B. 1280
- C. 1250
- D. 128,000

isro-2020 co-and-architecture disk normal

Answer key 

## 2.7

### Instruction Format (2)

#### 2.7.1 Instruction Format: ISRO2018-31



A byte addressable computer has a memory capacity of  $2^m KB$  ( $k$  bytes) and can perform  $2^n$  operations. An instruction involving 3 operands and one operator needs

maximum of:

- a.  $3m$  bits
- b.  $3m + n$  bits
- c.  $m + n$  bits
- d. none of the above

isro2018 co-and-architecture instruction-format

Answer key 

## 2.7.2 Instruction Format: ISRO2020-49 [top](#)

One instruction tries to write an operand before it is written by previous instruction. This may lead to a dependency called

- A. True dependency
- B. Anti-dependency
- C. Output dependency
- D. Control Hazard

isro-2020 co-and-architecture instruction-format normal

Answer key 

## 2.8

## Interrupts (1) [top](#)

### 2.8.1 Interrupts: ISRO2009-22 [top](#)

A certain microprocessor requires 4.5 microseconds to respond to an interrupt. Assuming that the three interrupts  $I_1$ ,  $I_2$  and  $I_3$  require the following execution time after the interrupt is recognized:

- i.  $I_1$  requires 25 microseconds
- ii.  $I_2$  requires 35 microseconds
- iii.  $I_3$  requires 20 microseconds

$I_1$  has the highest priority and  $I_3$  has the lowest. What is the possible range of time for  $I_3$  to be executed assuming that it may or may not occur simultaneously with other interrupts?

- A. 24.5 microseconds to 39.5 microseconds
- B. 24.5 microseconds to 93.5 microseconds
- C. 4.5 microseconds to 24.5 microseconds
- D. 29.5 microseconds to 93.5 microseconds

isro2009 co-and-architecture interrupts

Answer key 

## 2.9

## Io Handling (6) [top](#)

### 2.9.1 Io Handling: GATE CSE 2008 | Question: 64, ISRO2009-13 [top](#)

Which of the following statements about synchronous and asynchronous I/O is NOT true?

- A. An ISR is invoked on completion of I/O in synchronous I/O but not in asynchronous I/O
- B. In both synchronous and asynchronous I/O, an ISR (Interrupt Service Routine) is invoked after completion of the I/O
- C. A process making a synchronous I/O call waits until I/O is complete, but a process making an asynchronous I/O call does not wait for completion of the I/O
- D. In the case of synchronous I/O, the process waiting for the completion of I/O is woken up

by the ISR that is invoked after the completion of I/O

gatecse-2008 operating-system io-handling normal isro2009

Answer key 

### 2.9.2 Io Handling: ISRO2008-36 [top](#)

An interrupt in which the external device supplies its address as well as the interrupt requests is known as

- A. vectored interrupt
- B. maskable interrupt
- C. non maskable interrupt
- D. designated interrupt

isro2008 co-and-architecture io-handling interrupts

Answer key 

### 2.9.3 Io Handling: ISRO2009-78 [top](#)

On receiving an interrupt from an I/O device, the CPU

- A. Halts for a predetermined time
- B. Branches off to the interrupt service routine after completion of the current instruction
- C. Branches off to the interrupt service routine immediately
- D. Hands over control of address bus and data bus to the interrupting device

isro2009 co-and-architecture io-handling

Answer key 

### 2.9.4 Io Handling: ISRO2011-39 [top](#)

Two control signals in microprocessor which are related to Direct Memory Access (DMA) are

- A. INTR & INTA
- B. RD & WR
- C. S0 & S1
- D. HOLD & HLDA

isro2011 co-and-architecture io-handling dma

Answer key 

### 2.9.5 Io Handling: ISRO2011-58 [top](#)

In DMA transfer scheme, the transfer scheme other than burst mode is

- A. cycle technique
- B. stealing technique
- C. cycle stealing technique
- D. cycle bypass technique

isro2011 co-and-architecture io-handling dma

Answer key 

### 2.9.6 Io Handling: ISRO2018-65 [top](#)

Of the following, which best characterizes computers that use memory-mapped I/O?

- a. The computer provides special instructions for manipulating I/O ports

- b. *I/O* ports are placed at addresses on the bus and are accessed just like other memory locations
- c. To perform *I/O* operations, it is sufficient to place the data in an address register and call channel to perform the operation
- d. *I/O* can be performed only when memory management hardware is turned on

isro2018 co-and-architecture io-handling

[Answer key](#)

## 2.10

### Machine Instructions (2) [top](#)

#### 2.10.1 Machine Instructions: GATE CSE 2006 | Question: 09, ISRO2009-35 [top](#)



A CPU has *24-bit* instructions. A program starts at address 300 (in decimal). Which one of the following is a legal program counter (all values in decimal)?

- A. 400
- B. 500
- C. 600
- D. 700

gatecse-2006 co-and-architecture machine-instructions easy isro2009

[Answer key](#)

#### 2.10.2 Machine Instructions: ISRO2020-16 [top](#)



A computer which issues instructions in order, has only 2 registers and 3 opcodes ADD, SUB and MOV. Consider 2 different implementations of the following basic block :

Case 1	Case 2
$t1 = a + b;$	$t2 = c + d;$
$t2 = c + d;$	$t3 = e - t2;$
$t3 = e - t2;$	$t1 = a + b;$
$t4 = t1 - t2;$	$t4 = t1 - t2;$

Assume that all operands are initially in memory. Final value of computation also has to reside in memory. Which one is better in terms of memory accesses and by how many MOV instructions?

- A. Case 2,2
- B. Case 2,3
- C. Case 1,2
- D. Case 1,3

isro-2020 co-and-architecture machine-instructions normal

[Answer key](#)

## 2.11

### Memory Interfacing (6) [top](#)

#### 2.11.1 Memory Interfacing: ISRO2007-37 [top](#)



In comparison with static RAM memory, the dynamic Ram memory has

- A. lower bit density and higher power consumption
- B. higher bit density and higher power consumption

- C. lower bit density and lower power consumption  
D. higher bit density and lower power consumption

isro2007 co-and-architecture memory-interfacing

Answer key 

#### 2.11.2 Memory Interfacing: ISRO2009-23 [top](#)

The process of organizing the memory into two banks to allow 8-and 16-bit data operation is called

- A. Bank switching  
B. Indexed mapping  
C. Two-way memory interleaving  
D. Memory segmentation

isro2009 co-and-architecture memory-interfacing

Answer key 

#### 2.11.3 Memory Interfacing: ISRO2011-54 [top](#)

Number of chips ( $128 \times 8$  RAM) needed to provide a memory capacity of 2048 bytes

- A. 2                    B. 4                    C. 8                    D. 16

isro2011 co-and-architecture memory-interfacing non-gate

Answer key 

#### 2.11.4 Memory Interfacing: ISRO2014-1 [top](#)

Consider a 33MHz cpu based system. What is the number of wait states required if it is interfaced with a 60ns memory? Assume a maximum of 10ns delay for additional circuitry like buffering and decoding.

- A. 0                    B. 1  
C. 2                    D. 3

co-and-architecture isro2014 memory-interfacing

Answer key 

#### 2.11.5 Memory Interfacing: ISRO2015-77 [top](#)

In  $X = (M + N \times O) / (P \times Q)$ , how many one-address instructions are required to evaluate it?

- A. 4                    B. 6                    C. 8                    D. 10

memory-interfacing co-and-architecture machine-instructions isro2015

Answer key 

#### 2.11.6 Memory Interfacing: ISRO2017-18 [top](#)

How many  $128 \times 8$  bit RAMs are required to design  $32K \times 32$  bit RAM?

- A. 512                    B. 1024                    C. 128                    D. 32

**Answer key****2.12****Memory Management (1)****2.12.1 Memory Management: ISRO2015-62**

The minimum time delay between the initiation of two independent memory operations is called

- A. Access time
- B. Cycle time
- C. Rotational time
- D. Latency time

**Answer key****2.13****Microprogramming (1)****2.13.1 Microprogramming: ISRO2018-34**

Micro program is:

- a. the name of a source program in micro computers
- b. set of microinstructions that defines the individual operations in response to a machine-language instruction
- c. a primitive form of macros used in assembly language programming
- d. a very small segment of machine code

**Answer key****2.14****Number Representation (1)****2.14.1 Number Representation: ISRO2018-32**

A computer uses ternary system instead of the traditional system. An  $n$  bit string in the binary system will occupy

- |                                |                                |
|--------------------------------|--------------------------------|
| a. $3 + n$ ternary digits      | b. $2n/3$ ternary digits       |
| c. $n \log_2 3$ ternary digits | d. $n \log_3 2$ ternary digits |

**Answer key****2.15****Parallel Programming (1)****2.15.1 Parallel Programming: ISRO2018-71**

A particular parallel program computation requires 100 sec when executed on a single processor, if 40% of this computation is inherently sequential (i.e. will not benefit from additional processors), then theoretically best possible elapsed times of this program running with 2 and 4 processors, respectively, are:

- a. 20 sec and 10 sec  
b. 30 sec and 15 sec  
c. 50 sec and 25 sec  
d. 70 sec and 55 sec

isro2018 co-and-architecture parallel-programming

Answer key 

2.16

## Pipelining (9) top

### 2.16.1 Pipelining: GATE CSE 2002 | Question: 2.6, ISRO2008-19 top



The performance of a pipelined processor suffers if:

- A. the pipeline stages have different delays
- B. consecutive instructions are dependent on each other
- C. the pipeline stages share hardware resources
- D. All of the above

gatecse-2002 co-and-architecture pipelining easy isro2008

Answer key 

### 2.16.2 Pipelining: GATE CSE 2007 | Question: 37, ISRO2009-37 top



Consider a pipelined processor with the following four stages:

- IF: Instruction Fetch
- ID: Instruction Decode and Operand Fetch
- EX: Execute
- WB: Write Back

The IF, ID and WB stages take one clock cycle each to complete the operation. The number of clock cycles for the EX stage depends on the instruction. The ADD and SUB instructions need 1 clock cycle and the MUL instruction needs 3 clock cycles in the EX stage. Operand forwarding is used in the pipelined processor. What is the number of clock cycles taken to complete the following sequence of instructions?

<b>ADD</b>	R2, R1, R0	$R2 \leftarrow R1 + R0$
<b>MUL</b>	R4, R3, R2	$R4 \leftarrow R3 * R2$
<b>SUB</b>	R6, R5, R4	$R6 \leftarrow R5 - R4$

- A. 7                    B. 8                    C. 10                    D. 14

gatecse-2007 co-and-architecture pipelining normal isro2009

Answer key 

### 2.16.3 Pipelining: GATE CSE 2012 | Question: 20, ISRO2016-23 top



Register renaming is done in pipelined processors:

- A. as an alternative to register allocation at compile time
- B. for efficient access to function parameters and local variables
- C. to handle certain kinds of hazards
- D. as part of address translation

**Answer key****2.16.4 Pipelining: GATE IT 2007 | Question: 6, ISRO2011-25**

A processor takes 12 cycles to complete an instruction I. The corresponding pipelined processor uses 6 stages with the execution times of 3, 2, 5, 4, 6 and 2 cycles respectively. What is the asymptotic speedup assuming that a very large number of instructions are to be executed?

- A. 1.83      B. 2      C. 3      D. 6

**Answer key****2.16.5 Pipelining: ISRO2010-ECE Pipeline Hazard**

Consider the following assembly code for a hypothetical RISC processor with a 4-stage pipeline (Instruction Fetch, Decode/Register Read, Execute and Write).

```
add r1,r2,r3    // r1 = r2+r3
sub r4,r1,r3    //r4 = r1 - r3
mul r5,r2,r3    // r5 = r2*r3
```

Identify the possible pipeline hazard and the affected instruction.

- a) Read after write hazard during mul
- b) Read after write hazard during sub
- c) Read after write hazard during add
- d) Write after write hazard during mul

**Answer key****2.16.6 Pipelining: ISRO2015-EC Pipelining**

Pipelining technique is used in microprocessor to improve which of the following parameter?

- (a) Power dissipation
- (b) Interrupt latency
- (c) Die size
- (d) Maximum clock frequency

**Answer key**

## 2.16.7 Pipelining: ISRO2016-19 [top](#)



Consider a non-pipelined processor with a clock rate of 2.5 gigahertz and average cycles per instruction of four. The same processor is upgraded to a pipelined processor with five stages; but due to the internal pipeline delay, the clock speed is reduced to 2 gigahertz. Assume that there are no stalls in the pipeline. The speedup achieved in this pipelined processor is

- A. 3.2      B. 3.0      C. 2.2      D. 2.0

co-and-architecture    pipelining    isro2016

[Answer key](#)

## 2.16.8 Pipelining: ISRO2020-6 [top](#)



A non-pipelined CPU has 12 general purpose registers ( $R_0, R_1, R_2, \dots, R_{12}$ ). Following operations are supported

- ADD Ra, Rb, Rr    Add Ra to Rb and store the result in Rr
- MUL Ra, Rb, Rr    Multiply Ra to Rb and store the result in Rr

MUL operation takes two clock cycles, ADD takes one clock cycle.

Calculate minimum number of clock cycles required to compute the value of the expression  $XY + XYZ + YZ$ . The variable  $X, Y, Z$  are initially available in registers  $R_0, R_1$  and  $R_2$  and contents of these registers must not be modified.

- A. 5      B. 6      C. 7      D. 8

isro-2020    co-and-architecture    pipelining    normal

[Answer key](#)

## 2.16.9 Pipelining: ISRO2020-7 [top](#)



Consider a 5- segment pipeline with a clock cycle time 20 ns in each sub operation. Find out the approximate speed-up ratio between pipelined and non-pipelined system to execute 100 instructions. (if an average, every five cycles, a bubble due to data hazard has to be introduced in the pipeline)

- A. 5      B. 4.03      C. 4.81      D. 4.17

isro-2020    co-and-architecture    pipelining    normal

[Answer key](#)

## 2.17

## Ram (1) [top](#)



### 2.17.1 Ram: ISRO2014-17 [top](#)

If each address space represents one byte of storage space, how many address lines are needed to access RAM chips arranged in a  $4 \times 6$  array, where each chip is  $8K \times 4$  bits ?

- A. 13      B. 15      C. 16      D. 17

**Answer key****2.18****Runtime Environment (1)****2.18.1 Runtime Environment: GATE CSE 2008 | Question: 37, ISRO2009-38**

The use of multiple register windows with overlap causes a reduction in the number of memory accesses for:

- I. Function locals and parameters
  - II. Register saves and restores
  - III. Instruction fetches
- A. I only      B. II only      C. III only      D. I, II and III

**Answer key****Answer Keys**

2.1.1	C	2.1.2	D	2.1.3	Q-Q	2.1.4	Q-Q	2.1.5	A
2.1.6	C	2.2.1	B	2.2.2	C	2.2.3	D	2.2.4	D
2.2.5	C	2.2.6	B	2.2.7	C	2.2.8	C	2.2.9	B
2.3.1	B	2.3.2	C	2.3.3	D	2.3.4	C	2.3.5	A
2.3.6	C	2.3.7	A	2.4.1	A	2.4.2	D	2.4.3	A
2.4.4	D	2.4.5	C	2.4.6	C	2.4.7	A	2.4.8	A
2.4.9	C	2.4.10	Q-Q	2.4.11	B	2.4.12	A	2.4.13	Q-Q
2.4.14	Q-Q	2.4.15	Q-Q	2.4.16	Q-Q	2.4.17	Q-Q	2.4.18	D
2.4.19	C	2.4.20	A	2.4.21	B	2.4.22	A	2.4.23	D
2.4.24	C	2.5.1	D	2.6.1	C	2.7.1	D	2.7.2	C
2.8.1	B	2.9.1	B	2.9.2	A	2.9.3	B	2.9.4	D
2.9.5	C	2.9.6	B	2.10.1	C	2.10.2	A	2.11.1	B
2.11.2	C	2.11.3	D	2.11.4	D	2.11.5	C	2.11.6	B
2.12.1	B	2.13.1	B	2.14.1	D	2.15.1	D	2.16.1	D
2.16.2	B	2.16.3	C	2.16.4	B	2.16.5	Q-Q	2.16.6	Q-Q
2.16.7	A	2.16.8	B	2.16.9	B	2.17.1	D	2.18.1	A

3.0.1 ISRO2020-17 [top](#)

Which one indicates a technique of building cross compilers?

- A. Beta cross
- B. Canadian cross
- C. Mexican cross
- D. X-cross

isro-2020 compiler-design normal

[Answer key](#)

3.0.2 ISRO2009-32 [top](#)

The expression  $1 * 2 \wedge 3 * 4 \wedge 5 * 6$  will be evaluated as

- A.  $32^{30}$
- B.  $162^{30}$
- C. 49152
- D. 173458

In original question  
5 is not given.

isro2009 compiler-design

[Answer key](#)

3.0.3 ISRO2015-28 [top](#)

Yacc stands for

- A. yet accept compiler constructs
- C. yet another compiler constructs
- B. yet accept compiler compiler
- D. yet another compiler compiler

isro2015 compiler-design

[Answer key](#)

3.0.4 ISRO2008-68 [top](#)

Which of the following class of statement usually produces no executable code when compiled?

- A. declaration
- C. input and output statements
- B. assignment statements
- D. structural statements

isro2008 compiler-design

[Answer key](#)

3.0.5 ISRO2020-42 [top](#)

Which of the following is a type of a out-of-order execution, with the reordering done by a compiler

- A. loop unrolling
- C. strength reduction
- B. dead code elimination
- D. software pipelining

isro-2020 compiler-design normal

[Answer key](#)

### 3.0.6 ISRO2018-28 [top](#)



Incremental-Compiler is a compiler:

- a. which is written in a language that is different from the source language
- b. compiles the whole source code to generate object code afresh
- c. compiles only those portion of source code that have been modified
- d. that runs on one machine but produces object code for another machine

isro2018 compiler-design

[Answer key](#)

### 3.0.7 ISRO2008-38 [top](#)



Relative to the program translated by a compiler, the same program when interpreted runs

- A. Faster
- B. Slower
- C. At the same speed
- D. May be faster or slower

isro2008 compiler-design

[Answer key](#)

## 3.1

### Assembler (2) [top](#)



#### 3.1.1 Assembler: ISRO2016-43 [top](#)

A simple two-pass assembler does which of the following in the first pass:

- A. Checks to see if the instructions are legal in the current assembly mode
- B. It allocates space for the literals.
- C. It builds the symbol table for the symbols and their values.
- D. All of these

compiler-design assembler isro2016

[Answer key](#)

#### 3.1.2 Assembler: ISRO2020-14 [top](#)



In a two-pass assembler, resolution of subroutine calls and inclusion of labels in the symbol table is done during

- A. second pass
- B. first pass and second pass respectively
- C. second pass and first pass respectively
- D. first pass

isro-2020 compiler-design assembler easy

[Answer key](#)

## 3.2

### Code Optimization (6) [top](#)

### 3.2.1 Code Optimization: ISRO2009-43 [top](#)



Substitution of values for names (whose values are constants) is done in

- A. Local optimization
- B. Loop optimization
- C. Constant folding
- D. Strength reduction

isro2009 compiler-design code-optimization

[Answer key](#)

### 3.2.2 Code Optimization: ISRO2011-13 [top](#)



Which of the following statements about peephole optimization is False?

- A. It is applied to a small part of the code
- B. It can be used to optimize intermediate code
- C. To get the best out of this, it has to be applied repeatedly
- D. It can be applied to the portion of the code that is not contiguous

isro2011 compiler-design code-optimization

[Answer key](#)

### 3.2.3 Code Optimization: ISRO2011-3 [top](#)



In compiler terminology reduction in strength means

- A. Replacing run time computation by compile time computation
- B. Removing loop invariant computation
- C. Removing common subexpressions
- D. replacing a costly operation by a relatively cheaper one

isro2011 compiler-design code-optimization

[Answer key](#)

### 3.2.4 Code Optimization: ISRO2016-44 [top](#)



Peephole optimization is form of

- A. Loop optimization
- B. Local optimization
- C. Constant folding
- D. Data flow analysis

compiler-design code-optimization isro2016

[Answer key](#)

### 3.2.5 Code Optimization: ISRO2018-29 [top](#)



DU-chains(Definition-Use) in compiler design:

- a. consist of a definition of a variable and all its uses, reachable from that definition
- b. are created using a form static code analysis
- c. are prerequisite for many compiler optimization including constant propagation and common sub-expression elimination
- d. All of the above

**Answer key****3.2.6 Code Optimization: ISRO2018-30**

Which of the following comment about peep-hole optimization is true?

- It is applied to small part of the code and applied repeatedly
- It can be used to optimize intermediate code
- It can be applied to a portion of the code that is not contiguous
- It is applied in symbol table to optimize the memory requirements.

**Answer key****3.3****Compiler Tokenization (1)****3.3.1 Compiler Tokenization: ISRO2020-13**

The number of tokens in the following C code segment is

```
switch(inputvalue)
{
    case 1 : b =c*d; break;
    default : b =b++; break;
}
```

- A. 27      B. 29      C. 26      D. 24

**Answer key****3.4****Context Free Grammar (1)****3.4.1 Context Free Grammar: ISRO2018-64**

A particular BNF definition for a "word" is given by the following rules.

<word> :: = <letter> | <letter> <charpair> | <letter> <intpair>  
 <charpair> :: = <letter> <letter> | <charpair> <letter> <letter>  
 <intpair> :: = <integer> <integer> | <intpair> <integer> <integer>  
 <letter> :: = a | b | c | ..... | Y | Z  
 <integer> :: = 0 | 1 | 2 | ..... | 9

Which of the following lexical entries can be derived from &lt; word &gt;?

- pick
  - picks
  - c44
- A. I, II and III      B. I and II only      C. I and III only      D. II and III only

**Answer key****3.5****Expression (1)****3.5.1 Expression: ISRO2009-28**

The infix expression  $A + (B - C)^* D$  is correctly represented in prefix notation as

- A.  $A + B - C^* D$  B.  $+A^* - BCD$  C.  $ABC - D^* +$  D.  $A + BC - D^*$

**Answer key****3.6****Grammar (7)****3.6.1 Grammar: GATE CSE 2000 | Question: 2.21, ISRO2015-24**

Given the following expression grammar:

$$E \rightarrow E * F \mid F + E \mid F$$

$$F \rightarrow F - F \mid id$$

Which of the following is true?

- |                                       |                                       |
|---------------------------------------|---------------------------------------|
| A. $*$ has higher precedence than $+$ | B. $-$ has higher precedence than $*$ |
| C. $+$ and $-$ have same precedence   | D. $+$ has higher precedence than $*$ |

**Answer key****3.6.2 Grammar: GATE CSE 2006 | Question: 32, ISRO2016-35**

Consider the following statements about the context free grammar

$$G = \{S \rightarrow SS, S \rightarrow ab, S \rightarrow ba, S \rightarrow \epsilon\}$$

- I.  $G$  is ambiguous
- II.  $G$  produces all strings with equal number of  $a$ 's and  $b$ 's
- III.  $G$  can be accepted by a deterministic PDA.

Which combination below expresses all the true statements about  $G$ ?

- A. I only      B. I and III only      C. II and III only      D. I, II and III

**Answer key****3.6.3 Grammar: ISRO2011-43**

Which variable does not drive a terminal string in grammar?

- $S \rightarrow AB$
- $A \rightarrow a$
- $B \rightarrow b$
- $B \rightarrow C$

A. A      B. B      C. C      D. S

isro2011 compiler-design context-free-language grammar

[Answer key](#)



#### 3.6.4 Grammar: ISRO2014-52 [top](#)

Consider the following grammar.

- $S \rightarrow AB$
- $A \rightarrow a$
- $A \rightarrow BaB$
- $B \rightarrow bbA$

Which of the following statements is FALSE?

- A. The length of every string produced by this grammar is even
- B. No string produced by this grammar has three consecutive a's
- C. The length of substring produced by B is always odd
- D. No string produced by this grammar has four consecutive b's

isro2014 compiler-design grammar

[Answer key](#)



#### 3.6.5 Grammar: ISRO2020-35 [top](#)

Given the grammar

- $s \rightarrow T^*S \mid T$
- $T \rightarrow U + T \mid U$
- $U \rightarrow a \mid b$

Which of the following statements is wrong?

- |  |                                    |
|--|------------------------------------|
| A. Grammar is not ambiguous                    | B. Priority of + over * is ensured |
| C. Right to left evaluation of * and + happens | D. None of these                   |

isro-2020 compiler-design grammar easy

[Answer key](#)



#### 3.6.6 Grammar: ISRO2020-60 [top](#)

A given grammar is called ambiguous if

- A. two or more productions have the same non-terminal on the left hand side
- B. a derivation tree has more than one associated sentence
- C. there is a sentence with more than one derivation tree corresponding to it

D. brackets are not present in the grammar

isro-2020 compiler-design grammar easy

Answer key 

### 3.6.7 Grammar: ISRO2020-75 [top](#)

A grammar is defined as

- $A \rightarrow BC$
- $B \rightarrow x \mid Bx$
- $C \rightarrow B \mid D$
- $D \rightarrow y \mid Ey$
- $E \rightarrow z$

The non terminal alphabet of the grammar is

- A.  $\{A, B, C, D, E\}$  B.  $\{B, C, D, E\}$  C.  $\{A, B, C, D, E, x, y, z\}$

isro-2020 compiler-design grammar easy

Answer key 

## 3.7

### Lexical Analysis (1) [top](#)

#### 3.7.1 Lexical Analysis: GATE CSE 2000 | Question: 1.18, ISRO2015-25 [top](#)

The number of tokens in the following C statement is

```
printf("i=%d, &i=%x", i, &i);
```

- A. 3                    B. 26                    C. 10                    D. 21

gatecse-2000 compiler-design lexical-analysis easy isro2015

Answer key 

## 3.8

### Operator Grammar (1) [top](#)

#### 3.8.1 Operator Grammar: ISRO2015-26 [top](#)

Which grammar rules violate the requirement of the operator grammar? A, B, C are variables and a, b, c are terminals 

1.  $A \rightarrow BC$
2.  $A \rightarrow CcBb$
3.  $A \rightarrow BaC$
4.  $A \rightarrow \epsilon$

- (a) 1 only  
(b) 1 and 2  
(c) 1 and 3  
(d) 1 and 4

**Answer key****3.9****Parameter Passing (2)****3.9.1 Parameter Passing: GATE CSE 2004 | Question: 2,ISRO2017-54**

Consider the following function

```
void swap(int a, int b)
{
    int temp;
    temp = a;
    a = b;
    b = temp;
}
```

In order to exchange the values of two variables  $x$  and  $y$ .

- A. call  $swap(x, y)$
- B. call  $swap(&x, &y)$
- C.  $swap(x, y)$  cannot be used as it does not return any value
- D.  $swap(x, y)$  cannot be used as the parameters are passed by value

**Answer key****3.9.2 Parameter Passing: ISRO2015-80**

Consider the following code fragment

```
void foo(int x, int y)
{
    x+=y;
    y+=x;
}
main()
{
    int x=5.5;
    foo(x,x);
}
```

What is the final value of  $x$  in both call by value and call by reference, respectively?

- A. 5 and 16
- B. 5 and 12
- C. 5 and 20
- D. 12 and 20

**Answer key****3.10****Parsing (5)****3.10.1 Parsing: ISRO2014-5**

What is the number of steps required to derive the string ((( () ) ( )) for the following grammar?

isro2014 compiler-design parsing

## Answer key

3.10.2 Parsing: ISRO2015-27 top



Which one of the following is a top-down parser?

- A. Recursive descent parser
  - B. Shift left associative parser
  - C. SLR(k) parser
  - D. LR(k) parser

isro2015 compiler-design parsing

## Answer key

3.10.3 Parsing: ISRO2015-29 top



Which statement is true?

- A. LALR parser is more powerful and costly as compare to other parsers
  - B. All CFG's are LP and not all grammars are uniquely defined
  - C. Every SLR grammar is unambiguous but not every unambiguous grammar is SLR
  - D. LR(K) is the most general back tracking shift reduce parsing method

isro2015 compiler-design parsing

## Answer key

3.10.4 Parsing: ISRO2016-40 top



Recursive descent parsing is an example of

- A. Top-down parsers
  - B. Bottom-up parsers
  - C. Predictive parsers
  - D. None of the above

isro2016 compiler-design parsing

## Answer key

3.10.5 Parsing: ISRO2016-41 top



## A top-down parser generates

- A. Rightmost Derivation
  - B. Rightmost derivation in reverse
  - C. Leftmost derivation
  - D. Leftmost derivation in reverse

isro2016 compiler-design parsing

## Answer key

3.11

Runtime Environment (1) [top](#)

3.11.1 Runtime Environment: GATE CSE 1998 | Question: 1.25, ISRO2008-41 [top](#)



In a resident – OS computer, which of the following systems must reside in the main memory under all situations?

- A. Assembler      B. Linker      C. Loader      D. Compiler

gate1998 compiler-design runtime-environment normal isro2008

Answer key 

3.12

## Symbol Table (1) top

3.12.1 Symbol Table: ISRO2011-78 top



A symbol table of length 152 is processing 25 entries at any instant. What is occupation density?

- A. 0.164      B. 127      C. 8.06      D. 6.08

isro2011 compiler-design symbol-table

## Answer key

# Answer Keys

3.0.1	B	3.0.2	C	3.0.3	D	3.0.4	A	3.0.5	D
3.0.6	C	3.0.7	B	3.1.1	D	3.1.2	C	3.2.1	C
3.2.2	X	3.2.3	D	3.2.4	B	3.2.5	D	3.2.6	X
3.3.1	C	3.4.1	D	3.5.1	B	3.6.1	B	3.6.2	B
3.6.3	C	3.6.4	D	3.6.5	D	3.6.6	C	3.6.7	A
3.7.1	C	3.8.1	X	3.9.1	D	3.9.2	C	3.10.1	A
3.10.2	A	3.10.3	C	3.10.4	A	3.10.5	C	3.11.1	C
3.12.1	A								

**4.0.1 ISRO2014-ECE Computer Networks** top ↗

In a fiber-optic cable, which phenomenon occurs for signal to propagate along the inner core:

- A) Modulation
- B) Reflection
- C) Refraction
- D) All of the above

computer-networks isro2014-ece isro-ece

[Answer key](#) ↗

**4.0.2 ISRO2008-32** top ↗

The network 198.78.41.0 is a

- A. Class A network
- B. Class B network
- C. Class C network
- D. Class D network

isro2008 computer-networks

[Answer key](#) ↗

**4.0.3 ISRO2020-58** top ↗

Remote Procedure Calls are used for

- A. communication between two processes remotely different from each other on the same system
- B. communication between two processes on the same system
- C. communication between two processes on the separate systems
- D. none of the above

isro-2020 computer-networks normal

[Answer key](#) ↗

**4.0.4 ISRO2014-ECE : Network** top ↗

In satellite communication, scrambling is mainly used for:

- a) Clock recovery
- b) Encryption
- c) limiting power spectral density

d) bandwidth efficiency

isro-ece isro2014-ece computer-networks

Answer key 

#### 4.0.5 ISRO2017-34 [top](#)

Match with the suitable one :

##### List-1

- (A) Multicast group membership
- (B) Interior gateway protocol
- (C) Exterior gateway protocol
- (D) RIP

- A. A-2, B-3, C-4, D-1
- C. A-3, B-4, C-1, D-2

isro2017 computer-networks

##### List-2

- 1. Distance Vector routing
- 2. IGMP
- 3. OSPF
- 4. BGP

- B. A-2, B-4, C-3, D-1
- D. A-3, B-1, C-4, D-2

Answer key 

#### 4.0.6 ISRO2017-28 [top](#)

In networking terminology UTP means

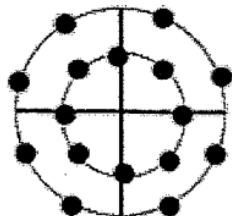
- A. Uniquitous teflon port
- C. Unshielded twisted pair
- B. Uniformly terminating port
- D. Unshielded T-connector port

isro2017 computer-networks

Answer key 

#### 4.0.7 ISRO2012-ECE Networks [top](#)

Following constellation diagram represents:



- a. 16 PSK
- b. 16 QAM
- c. 16 APSK
- d. All the above

isro-ece isro2012-ece computer-networks

#### 4.0.8 ISRO2009-5 [top](#)



What is the primary purpose of a VLAN?

- A. Demonstrating the proper layout for a network
- B. Simulating a network
- C. To create a virtual private network
- D. Segmenting a network inside a switch or device

isro2009 computer-networks

[Answer key](#)

#### 4.0.9 ISRO2009-2 [top](#)



In networking, UTP stands for

- A. Unshielded T-connector port
- B. Unshielded twisted pair
- C. Unshielded terminating pair
- D. Unshielded transmission process

isro2009 computer-networks

[Answer key](#)

#### 4.0.10 ISRO2014-EC Computer Network [top](#)



Match the following:

- |                         |  |
|-------------------------|--|
| A Gaussian distribution | 1 Calls on a telephone channel             |
| B Rayleigh distribution | 2 Random number                            |
| C Poisson distribution  | 3 Thermal noise                            |
| D Uniform distribution  | 4 Fading channel in wireless communication |

- 
- A) A-3, B-1, C-4, D-2
  - B) A-3, B-4, C-2, D-1
  - C) A-1, B-4, C-3, D-2
  - D) A-3, B-4, C-1, D-2

isro-ece isro2014-ece computer-networks

#### 4.0.11 ISRO2015-EC Computer networks [top](#)



A communication channel is having a bandwidth of 3000 Hz. The transmitted power is such that the received Signal-to-Noise ratio is 1023. The maximum data rate that can be transmitted error-free through the channel is:

- (a) 3 Kbps
- (b) 3 Mbps
- (c) 30 Kbps
- (d) 300 Kbps

isro2015-ece computer-networks isro-ece

[Answer key](#)

#### 4.0.12 ISRO2014-6 [top](#)



The process of modifying IP address information in IP packet headers while in transit across a traffic routing device is called

- A. Port address translation (PAT)
- B. Network address translation (NAT)
- C. Address mapping
- D. Port mapping

isro2014 computer-networks

[Answer key](#)

#### 4.0.13 ISRO2016-ECE Networks [top](#)



Hamming codes are used for

- (a) Burst error correction
- (b) Signal error correction
- (c) Both (a) and (b)
- (d) None of the above

isro2016-ece computer-networks

[Answer key](#)

#### 4.0.14 ISRO2016-ECE Networks [top](#)



An FM signal at 10.7 MHz IF needs to be digitized for demodulation in a digital domain. If the bandwidth of this signal is 200 kHz, the maximum usable sampling frequency is

- (a) 200 kHz
- (b) 600 kHz
- (c) 400 kHz
- (d) 800 kHz

isro2016-ece computer-networks

#### 4.0.15 ISRO2016-ECE Networks [top](#)



A typical optical fiber has

- (a) high refractive index core & low refractive index cladding
- (b) Low refractive index core & high refractive index cladding
- (c) Uniform refractive index core surrounded by variable refractive index cladding
- (d) None of the above

isro2016-ece computer-networks

[Answer key](#)

#### 4.0.16 ISRO2007-66 [top](#)



Silly Window Syndrome is related to

- A. Error during transmission
- B. File transfer protocol
- C. Degrade in TCP performance
- D. Interface problem

isro2007 computer-networks

[Answer key](#)

## 4.0.17 ISRO2015-ECE Networks [top](#)



Which of the following modulation scheme requires minimum power for transmission?

- (a) QPSK
- (b) 16-QAM
- (c) 8-PSK
- (d) 64-QAM

isro2015-ece computer-networks

## 4.0.18 ISRO2015-ECE Networks [top](#)



A signal transmitted from an Earth station bounces back from a geostationary satellite, with an altitude of 35864 km from the Earth surface. The range from the Earth station, is 38200 km. The round trip time is about: (excluding processing delays and assuming  $c = 3 \times 10^8 \text{ m/s}$ )

- (a) 255 ms
- (b) 127 ms
- (c) 239 ms
- (d) 120 ms

computer-networks isro2015-ece

[Answer key](#)

## 4.1

## Application Layer Protocols (1) [top](#)



### 4.1.1 Application Layer Protocols: GATE CSE 2008 | Question: 14, ISRO2016-74 [top](#)

What is the maximum size of data that the application layer can pass on to the TCP layer below?

- A. Any size
- B.  $2^{16}$  bytes - size of TCP header
- C.  $2^{16}$  bytes
- D. 1500 bytes

gatecse-2008 easy computer-networks application-layer-protocols isro2016

[Answer key](#)

## 4.2

## Binary Codes (1) [top](#)



### 4.2.1 Binary Codes: ISRO2015-6 [top](#)

The code which uses 7 bits to represent a character is :

- A. ASCII
- B. BCD
- C. EBCDIC
- D. Gray

isro2015 binary-codes

[Answer key](#)

## 4.3

## Communication (7) [top](#)



### 4.3.1 Communication: ISRO2007-20 [top](#)



If the bandwidth of a signal is 5 kHz and the lowest frequency is 52 kHz, what is the highest frequency

- A. 5 kHz
- B. 10 kHz
- C. 47 kHz
- D. 57 kHz

isro2007 communication

[Answer key](#)

### 4.3.2 Communication: ISRO2007-22 [top](#)



Phase transition for each bit are used in

- A. Amplitude modulation
- B. Carrier modulation
- C. Manchester encoding
- D. NRZ encoding

isro2007 computer-networks communication

[Answer key](#)

### 4.3.3 Communication: ISRO2007-24, ISRO2016-67 [top](#)



Bit stuffing refers to

- A. inserting a 0 in user stream to differentiate it with a flag
- B. inserting a 0 in flag stream to avoid ambiguity
- C. appending a nipple to the flag sequence
- D. appending a nipple to the use data stream

isro2007 communication isro2016

[Answer key](#)

### 4.3.4 Communication: ISRO2008-9 [top](#)



What is the bandwidth of the signal that ranges from 40 kHz 4 MHz

- A. 36 MHz
- B. 360 kHz
- C. 3.96 MHz
- D. 396 kHz

isro2008 communication non-gate

[Answer key](#)

### 4.3.5 Communication: ISRO2011-1 [top](#)



The encoding technique used to transmit the signal in giga ethernet technology over fiber optic medium is

- A. Differential Manchester encoding
- B. Non return to zero
- C. 4B/5B encoding
- D. 8B/10B encoding

computer-networks isro2011 communication

[Answer key](#)

#### 4.3.6 Communication: ISRO2014-45 [top](#)



Consider a 50 kbps satellite channel with a 500 milliseconds round trip propagation delay. If the sender wants to transmit 1000 bit frames, how much time will it take for the receiver to receive the frame?

- A. 250 milliseconds
- B. 20 milliseconds
- C. 520 milliseconds
- D. 270 milliseconds

isro2014 computer-networks communication

[Answer key](#)

#### 4.3.7 Communication: ISRO2015-49 [top](#)



What frequency range is used for microwave communications, satellite and radar?

- A. Low frequency: 30 kHz to 300 kHz
- B. Medium frequency: 300 kHz to 3 MHz
- C. Super high frequency: 3000 MHz to 30000 MHz
- D. Extremely high frequency: 30000 kHz

isro2015 computer-networks communication

[Answer key](#)

### 4.4

#### Crc Polynomial (3) [top](#)



##### 4.4.1 Crc Polynomial: GATE CSE 2007 | Question: 68, ISRO2016-73 [top](#)

The message 11001001 is to be transmitted using the CRC polynomial  $x^3 + 1$  to protect it from errors. The message that should be transmitted is:

- A. 11001001000
- B. 11001001011
- C. 11001010
- D. 110010010011

gatecse-2007 computer-networks error-detection crc-polynomial normal isro2016

[Answer key](#)

##### 4.4.2 Crc Polynomial: ISRO2015-52 [top](#)



In CRC if the data unit is 100111001 and the divisor is 1011 then what is dividend at the receiver?

- A. 100111001101
- B. 100111001011
- C. 100111001
- D. 100111001110

isro2015 computer-networks crc-polynomial

[Answer key](#)

##### 4.4.3 Crc Polynomial: ISRO2018-11 [top](#)



\_\_\_\_\_ can detect burst error of length less than or equal to degree of the polynomial and detects burst errors that affect odd number of bits.

- a. Hamming Code
- b. CRC
- c. VRC
- d. None of the above

**Answer key****4.5****Cryptography (4)****4.5.1 Cryptography: ISRO2009-7**[top](#)

Advanced Encryption Standard (AES) is based on

- A. Asymmetric key algorithm
- B. Symmetric key algorithm
- C. Public key algorithm
- D. Key exchange

**Answer key****4.5.2 Cryptography: ISRO2018-78**[top](#)

Which one of the following algorithm is not used in asymmetric key cryptography?

- a. RSA Algorithm
- b. Gillie-Hellman Algorithm
- c. Electronic Code Book Algorithm
- d. None of the above

**Answer key****4.5.3 Cryptography: ISRO2020-44**[top](#)

In a columnar transportation cipher, the plain text is “the tomato is a plant in the night shade family”, keyword is “TOMATO”. The cipher text is

- A. ”TINESAX / EOAHTFX / HTLTHEY / MAIIAIX / TAPNGDL / OSTNHEMX”
- B. ”TINESAX / EOAHTFX / MAIIAIX / HTLTHEY / TAPNGDL / OSTNHEMX”
- C. ”TINESAX / EOAHTFX / HTLTHEY / MAIIAIX / OSTNHEMX / TAPNGDL”
- D. ”EOAHTFX / TINESAX / HTLTHEY / MAIIAIX / TAPNGDL / OSTNHEMX”

**Answer key****4.5.4 Cryptography: ISRO2020-45**[top](#)

Avalanche effect in cryptography refers

- A. Large changes in cipher text when the keyword is changed minimally
- B. Large changes in cipher text when the plain text is changed
- C. Large Impact of keyword change to length of the cipher text
- D. None of the above

**Answer key****4.6****Csma Cd (2)**[top](#)

#### 4.6.1 Csma Cd: ISRO2008-6 [top](#)



Which of the following transmission media is not readily suitable to CSMA operation?

- A. Radio
- B. Optical fibers
- C. Coaxial cable
- D. Twisted pair

isro2008 computer-networks csma-cd

[Answer key](#)

#### 4.6.2 Csma Cd: ISRO2016-69 [top](#)



In Ethernet CSMA/CD, the special bit sequence transmitted by media access management to handle collision is called

- A. Preamble
- B. Postamble
- C. Jam
- D. None of these

computer-networks csma-cd isro2016

[Answer key](#)

### 4.7

#### Dns (2) [top](#)



#### 4.7.1 Dns: ISRO2015-44 [top](#)

The DNS maps the IP address to

- A. A binary address as strings
- B. A n alphanumeric address
- C. A hierarchy of domain names
- D. A hexadecimal address

isro2015 computer-networks dns

[Answer key](#)

#### 4.7.2 Dns: ISRO2016-80 [top](#)



When a DNS server accepts and uses incorrect information from a host that has no authority giving that information, then it is called

- A. DNS lookup
- B. DNS hijacking
- C. DNS spoofing
- D. None of the mentioned

isro2016 computer-networks dns

[Answer key](#)

### 4.8

#### Encoding (1) [top](#)



#### 4.8.1 Encoding: ISRO2007-13 [top](#)

By using an eight bit optical encoder the degree of resolution that can be obtained is (approximately)

- A.  $1.8^\circ$
- B.  $3.4^\circ$
- C.  $2.8^\circ$
- D.  $1.4^\circ$

isro2007 communication encoding

[Answer key](#)

### 4.9

#### Error Correction (1) [top](#)

#### 4.9.1 Error Correction: ISRO2011-48 [top](#)



The hamming distance between the octets of 0xAA and 0x55 is

- A. 7
- B. 5
- C. 8
- D. 6

isro2011 computer-networks error-correction hamming-code

[Answer key](#)

#### 4.10

#### Error Detection (1) [top](#)



##### 4.10.1 Error Detection: ISRO2011-50 [top](#)

Data is transmitted continuously at 2.048 Mbps rate for 10 hours and received 512 bits errors. What is the bit error rate?

- A. 6.9 e-9
- B. 6.9 e-6
- C. 69 e-9
- D. 4 e-9

isro2011 computer-networks error-detection

[Answer key](#)

#### 4.11

#### Ethernet (4) [top](#)



##### 4.11.1 Ethernet: ISRO2007-21 [top](#)

An Ethernet hub

- A. functions as a repeater
- B. connects to a digital PBX
- C. connects to a token-ring network
- D. functions as a gateway

isro2007 computer-networks ethernet

[Answer key](#)



##### 4.11.2 Ethernet: ISRO2008-5 [top](#)

In Ethernet, the source address field in the MAC frame is the \_\_\_\_\_ address.

- A. original sender's physical
- B. previous station's physical
- C. next destination's physical
- D. original sender's service port

isro2008 computer-networks ethernet

[Answer key](#)



##### 4.11.3 Ethernet: ISRO2014-61 [top](#)

A mechanism or technology used in Ethernet by which two connected devices choose common transmission parameters such as speed, duplex mode and flow control is called

- A. Autosense
- B. Synchronization
- C. Pinging
- D. Auto negotiation

isro2014 computer-networks ethernet

[Answer key](#)

#### 4.11.4 Ethernet: ISRO2017-33 [top](#)



An Ethernet frame that is less than the IEEE 802.3 minimum length of 64 octets is called

- A. Short frame
- B. Small frame
- C. Mini frame
- D. Runt frame

isro2017 computer-networks ethernet

[Answer key](#)

#### 4.12

#### Firewall (1) [top](#)



##### 4.12.1 Firewall: ISRO2018-77 [top](#)

What is one advantage of setting up a *DMZ* (Demilitarized Zone) with two firewalls?

- A. You can control where traffic goes in the three networks
- B. You can do statefull packet filtering
- C. You can do load balancing
- D. Improve network performance

isro2018 computer-networks network-security firewall

[Answer key](#)

#### 4.13

#### Icmp (1) [top](#)



##### 4.13.1 Icmp: ISRO2014-58 [top](#)

Assume the following information.

- Original timestamp value = 46
- Receive timestamp value = 59
- Transmit timestamp value = 60
- Timestamp at arrival of packet = 69

Which of the following statements is correct?

- A. Receive clock should go back by 3 milliseconds
- B. Transmit and Receive clocks are synchronized
- C. Transmit clock should go back by 3 milliseconds
- D. Receive clock should go ahead by 1 milliseconds

isro2014 computer-networks icmp

[Answer key](#)

#### 4.14

#### Ip Packet (3) [top](#)



##### 4.14.1 Ip Packet: ISRO2009-74 [top](#)

Use of IPSEC in tunnel mode results in

- A. IP packet with same header
- B. IP packet with new header

C. IP packet without header

D. No changes in IP packet

isro2009 computer-networks ip-packet

Answer key 

#### 4.14.2 Ip Packet: ISRO2014-31 [top](#)

A IP packet has arrived in which the fragmentation offset value is 100, the value of HLEN is 5 and the value of total length field is 200. What is the number of the last byte?

A. 194

B. 394

C. 979

D. 1179

computer-networks ip-packet isro2014

Answer key 

#### 4.14.3 Ip Packet: ISRO2014-55 [top](#)

An IP packet has arrived with the first 8 bits as 0100 0010. Which of the following is correct?

- A. The number of hops this packet can travel is 2.
- B. The total number of bytes in header is 16 bytes
- C. The upper layer protocol is ICMP
- D. The receiver rejects the packet

isro2014 computer-networks ip-packet

Answer key 

### 4.15

#### Lan Technologies (1) [top](#)

##### 4.15.1 Lan Technologies: ISRO2008-4 [top](#)

On a LAN , where are IP datagrams transported?

- A. In the LAN header
- B. In the application field
- C. In the information field of the LAN frame
- D. After the TCP header

isro2008 computer-networks lan-technologies

Answer key 

### 4.16

#### Link State Routing (1) [top](#)

##### 4.16.1 Link State Routing: ISRO2007-26 [top](#)

If there are five routers and six networks in intranet using link state routing, how many routing tables are there?

A. 1

B. 5

C. 6

D. 11

isro2007 computer-networks routing link-state-routing

Answer key 

**4.17****Mac Protocol (1)** [top](#)**4.17.1 Mac Protocol: ISRO2014-71** [top](#)

Which of the following is not a valid multicast MAC address?

- A. 01:00:5E:00:00:00
- B. 01:00:5E:00:00:FF
- C. 01:00:5E:00:FF:FF
- D. 01:00:5E:FF:FF:FF

computer-networks mac-protocol isro2014

**Answer key** [\[pdf\]](#)**4.18****Md5 (1)** [top](#)**4.18.1 Md5: ISRO2017-35** [top](#)

MD5 is a widely used hash function for producing hash value of

- A. 64 bits
- B. 128 bits
- C. 512 bits
- D. 1024 bits

isro2017 computer-networks network-security md5

**Answer key** [\[pdf\]](#)**4.19****Network Addressing (1)** [top](#)**4.19.1 Network Addressing: ISRO2009-4** [top](#)

Which of the following is a MAC address?

- A. 192.166.200.50
- B. 00056A:01A01A5CCA7FF60
- C. 568, Airport Road
- D. 01:A5:BB:A7:FF:60

isro2009 computer-networks network-addressing

**Answer key** [\[pdf\]](#)**4.20****Network Layering (3)** [top](#)**4.20.1 Network Layering: ISRO2007-75** [top](#)

When a host on network A sends a message to a host on network B, which address does the router look at?

- A. Port
- B. IP
- C. Physical
- D. Subnet mask

isro2007 computer-networks network-layering

**Answer key** [\[pdf\]](#)**4.20.2 Network Layering: ISRO2011-32** [top](#)

In which layer of network architecture, the secured socket layer (SSL) is used?

- A. physical layer
- B. session layer
- C. application layer
- D. presentation layer

isro2011 computer-networks network-security network-layering

**Answer key** [\[pdf\]](#)

### 4.20.3 Network Layering: ISRO2015-58 [top](#)



Which layers of the OSI reference model are host-to-host layers?

- A. Transport, session, presentation, application
- B. Session, presentation, application
- C. Datalink, transport, presentation, application
- D. Physical, datalink, network, transport

isro2015 computer-networks network-layering

[Answer key](#)

## 4.21

### Network Protocols (7) [top](#)



#### 4.21.1 Network Protocols: ISRO2007-63 [top](#)

Which of these is not a feature of WAP 2.0

- A. Push and Pull Model
- B. Interface to a storage device
- C. Multimedia messaging
- D. Hashing

isro2007 network-protocols

[Answer key](#)



#### 4.21.2 Network Protocols: ISRO2008-10 [top](#)

Which Project 802 standard provides for a collision-free protocol?

- A. 802.2
- B. 802.3
- C. 802.5
- D. 802.6

isro2008 computer-networks network-protocols

[Answer key](#)



#### 4.21.3 Network Protocols: ISRO2009-3 [top](#)

The address resolution protocol (ARP) is used for

- A. Finding the IP address from the DNS
- B. Finding the IP address of the default gateway
- C. Finding the IP address that corresponds to a MAC address
- D. Finding the MAC address that corresponds to an IP address

isro2009 computer-networks network-protocols

[Answer key](#)



#### 4.21.4 Network Protocols: ISRO2011-12 [top](#)

The network protocol which is used to get MAC address of a node by providing IP address is

- A. SMTP
- B. ARP
- C. RIP
- D. BOOTP

isro2011 computer-networks network-protocols

[Answer key](#)

#### 4.21.5 Network Protocols: ISRO2011-69 [top](#)



Lightweight Directory Access protocol is used for

- A. Routing the packets
- B. Authentication
- C. obtaining IP address
- D. domain name resolving

isro2011 computer-networks network-protocols

[Answer key](#)

#### 4.21.6 Network Protocols: ISRO2016-70 [top](#)



Which network protocol allows hosts to dynamically get a unique IP number on each bootup

- A. DHCP
- B. BOOTP
- C. RARP
- D. ARP

isro2016 computer-networks network-protocols

[Answer key](#)

#### 4.21.7 Network Protocols: ISRO2017-31 [top](#)



Which of the following protocol is used for transferring electronic mail messages from one machine to another?

- A. TELNET
- B. FTP
- C. SNMP
- D. SMTP

isro2017 computer-networks network-protocols

[Answer key](#)

### 4.22

### Network Security (11) [top](#)



#### 4.22.1 Network Security: ISRO2007-68 [top](#)

SSL is not responsible for

- A. Mutual authentication of client & server
- B. Secret communication
- C. Data Integrity protection
- D. Error detection and correction

isro2007 computer-networks network-security

[Answer key](#)

#### 4.22.2 Network Security: ISRO2007-70 [top](#)



The standard for certificates used on internet is

- A. X.25
- B. X.301
- C. X.409
- D. X.509

isro2007 computer-networks network-security

[Answer key](#)

### 4.22.3 Network Security: ISRO2007-71 [top](#)



Hashed message is signed by a sender using

- A. his public key
- B. his private key
- C. receiver's public key
- D. receiver's private key

isro2007 computer-networks network-security

[Answer key](#)

### 4.22.4 Network Security: ISRO2008-59 [top](#)



A public key encryption system

- A. allows anyone to decode the transmissions
- B. allows only the correct sender to decode the data
- C. allows only the correct receiver to decode the data
- D. does not encode the data before transmitting it

isro2008 computer-networks network-security

[Answer key](#)

### 4.22.5 Network Security: ISRO2009-6 [top](#)



SHA-1 is a

- A. encryption algorithm
- B. decryption algorithm
- C. key exchange algorithm
- D. message digest function

isro2009 computer-networks network-security

[Answer key](#)

### 4.22.6 Network Security: ISRO2011-18 [top](#)



An example of poly-alphabetic substitution is

- A. P-box
- B. S-box
- C. Caesar cipher
- D. Vigenere cipher

isro2011 computer-networks network-security

[Answer key](#)

### 4.22.7 Network Security: ISRO2014-24 [top](#)



In a system an RSA algorithm with  $p = 5$  and  $q = 11$ , is implemented for data security. What is the value of the decryption key if the value of the encryption key is 27?

- A. 3
- B. 7
- C. 27
- D. 40

isro2014 computer-networks network-security

[Answer key](#)

#### 4.22.8 Network Security: ISRO2017-36 [top](#)



Which protocol suite designed by IETF to provide security for a packet at the Internet layer?

- A. IPSec
- B. NetSec
- C. PacketSec
- D. SSL

isro2017 computer-networks network-security

[Answer key](#)

#### 4.22.9 Network Security: ISRO2017-37 [top](#)



Pretty Good Privacy (PGP) is used in:

- A. Browser security
- B. FTP security
- C. Email security
- D. None of the above

isro2017 computer-networks network-security

[Answer key](#)

#### 4.22.10 Network Security: ISRO2018-46 [top](#)



In cryptography, the following uses transposition ciphers and the keyword is LAYER. Encrypt the following message. (Spaces are omitted during encryption)

WELCOME TO NETWORK SECURITY!

- a. WMEKREETSILTWTWETCOOCYONRU!
- b. EETSICOOCYWMERKRONRU!LTWET
- c. LTWETONRU!WMEKRCOOCYEETSI
- d. ONRU!COOCYLTWETEETSIWMEKR

isro2018 computer-networks network-security

[Answer key](#)

#### 4.22.11 Network Security: ISRO2018-74 [top](#)



Avalanche effect in cryptography

- a. Is desirable property of cryptographic algorithm
- b. Is undesirable property of cryptographic algorithm
- c. Has no effect on encryption algorithm
- d. None of the above

isro2018 computer-networks network-security

[Answer key](#)

### 4.23

#### Network Topologies (2) [top](#)



##### 4.23.1 Network Topologies: ISRO2017-27 [top](#)

Physical topology of FDDI is?

- A. Bus
- B. Ring
- C. Star
- D. None of the above

isro2017 computer-networks network-topologies

[Answer key](#)

## 4.23.2 Network Topologies: ISRO2017-30 [top](#)



If there are  $n$  devices (nodes) in a network, what is the number of cable links required for a fully connected mesh and a star topology respectively

- A.  $n(n - 1)/2$ , n B.  $1n$ ,  $n - 1$  C.  $n - 1$ ,  $n$  D.  $n - 1$ ,  $n(n - 1)/2$

isro2017 computer-networks network-topologies

Answer key

## 4.24

### Ping (1) [top](#)



#### 4.24.1 Ping: ISRO2015-56 [top](#)

Which statement is false?

- A. PING is a TCP/IP application that sends datagrams once every second in the hope of an echo response from the machine being PINGED  
B. If the machine is connected and running a TCP/IP protocol stack, it should respond to the PING datagram with a datagram of its own  
C. If PING encounters an error condition, an ICMP message is not returned  
D. PING display the time of the return response in milliseconds or one of several error message

isro2015 computer-networks network-protocols ping

Answer key

## 4.25

### Routers Bridge Hubs Switches (2) [top](#)



#### 4.25.1 Routers Bridge Hubs Switches: ISRO2011-71 [top](#)

One SAN switch has 24 ports. All 24 supports 8 Gbps Fiber Channel technology. What is the aggregate bandwidth of that SAN switch?

- A. 96 Gbps B. 192 Mbps C. 512 Gbps D. 192 Gbps

isro2011 computer-networks routers-bridge-hubs-switches

Answer key

#### 4.25.2 Routers Bridge Hubs Switches: ISRO2015-48 [top](#)



A T-switch is used to

- A. Control how messages are passed between computers  
B. Echo every character that is received  
C. Transmit characters one at a time  
D. Rearrange the connections between computing equipments

isro2015 computer-networks routers-bridge-hubs-switches

Answer key

**4.26.1 Routing: ISRO2014-16** [top](#)

What is routing algorithm used by OSPF routing protocol?

- A. Distance vector
- B. Flooding
- C. Path vector
- D. Link state

[computer-networks](#) [routing](#) [isro2014](#)

[Answer key](#)

**4.26.2 Routing: ISRO2016-68** [top](#)

Dynamic routing protocol enable routers to

- A. Dynamically discover and maintain routes
- B. Distribute routing updates to other routers
- C. Reach agreement with other routers about the network topology
- D. All of the above

[isro2016](#) [computer-networks](#) [routing](#)

[Answer key](#)

**4.27.1 Serial Communication: GATE CSE 1993 | Question: 6.4, ISRO2008-14** [top](#)

Assume that each character code consists of 8 bits. The number of characters that can be transmitted per second through an asynchronous serial line at 2400 baud rate, and with two stop bits is

- A. 109
- B. 216
- C. 218
- D. 219

[gate1993](#) [computer-networks](#) [serial-communication](#) [normal](#) [isro2008](#) [out-of-gate-syllabus](#)

[Answer key](#)

**4.27.2 Serial Communication: ISRO2007-19** [top](#)

Assume that each character code consists of 8 bits. The number of characters that can be transmitted per second through a synchronous serial line at 2400 baud rate, and with two stop bits is

- A. 109
- B. 216
- C. 218
- D. 219

[isro2007](#) [serial-communication](#)

[Answer key](#)

**4.27.3 Serial Communication: ISRO2015-51** [top](#)

How many characters per sec (7 bits + 1 parity) can be transmitted over a 2400 bps line if the transfer is synchronous ( 1 start and 1 stop bit)?

- A. 300
- B. 240
- C. 250
- D. 275

**Answer key****4.28****Sliding Window (3)****4.28.1 Sliding Window: GATE CSE 2009 | Question: 57, ISRO2016-75**

Frames of 1000 bits are sent over a  $10^6$  bps duplex link between two hosts. The propagation time is 25 ms. Frames are to be transmitted into this link to maximally pack them in transit (within the link).

What is the minimum number of bits ( $I$ ) that will be required to represent the sequence numbers distinctly? Assume that no time gap needs to be given between transmission of two frames.

- A.  $I = 2$
- B.  $I = 3$
- C.  $I = 4$
- D.  $I = 5$

**Answer key****4.28.2 Sliding Window: ISRO2008-8**

The TCP sliding window

- A. can be used to control the flow of information
- B. always occurs when the field value is 0
- C. always occurs when the field value is 1
- D. occurs horizontally

**Answer key****4.28.3 Sliding Window: ISRO2018-44**

Station  $A$  uses 32 byte packets to transmit messages to Station  $B$  using a sliding window protocol. The round trip delay between  $A$  and  $B$  is 80 ms and the bottleneck bandwidth on the path between  $A$  and  $B$  is 128 kbps. What is the optimal window size that  $A$  should use?

- a. 20
- b. 40
- c. 160
- d. 320

**Answer key****4.29****Slotted Aloha (1)****4.29.1 Slotted Aloha: ISRO2015-55**

A certain population of ALOHA users manages to generate 70 request/sec. If the time is slotted in units of 50 msec, then channel load would be

- A. 4.25
- B. 3.5
- C. 450
- D. 350

[Answer key](#)

4.30

Subnetting (9) [top](#)

**4.30.1 Subnetting: GATE CSE 2003 | Question: 82, ISRO2009-1** [top](#)



The subnet mask for a particular network is 255.255.31.0. Which of the following pairs of IP addresses could belong to this network?

- A. 172.57.88.62 and 172.56.87.23
- B. 10.35.28.2 and 10.35.29.4
- C. 191.203.31.87 and 191.234.31.88
- D. 128.8.129.43 and 128.8.161.55

gatecse-2003 computer-networks subnetting normal isro2009

[Answer key](#)

**4.30.2 Subnetting: GATE CSE 2007 | Question: 67, ISRO2016-72** [top](#)



The address of a class *B* host is to be split into subnets with a 6-bit subnet number. What is the maximum number of subnets and the maximum number of hosts in each subnet?

- A. 62 subnets and 262142 hosts.
- B. 64 subnets and 262142 hosts.
- C. 62 subnets and 1022 hosts.
- D. 64 subnets and 1024 hosts.

gatecse-2007 computer-networks subnetting easy isro2016

[Answer key](#)

**4.30.3 Subnetting: GATE IT 2006 | Question: 63, ISRO2015-57** [top](#)



A router uses the following routing table:

Destination	Mask	Interface
144.16.0.0	255.255.0.0	eth0
144.16.64.0	255.255.224.0	eth1
144.16.68.0	255.255.255.0	eth2
144.16.68.64	255.255.255.224	eth3

Packet bearing a destination address 144.16.68.117 arrives at the router. On which interface will it be forwarded?

- A. eth0
- B. eth1
- C. eth2
- D. eth3

gateit-2006 computer-networks subnetting normal isro2015

[Answer key](#)

**4.30.4 Subnetting: ISRO2007-73** [top](#)



Range of IP Address from 224.0.0.0 to 239.255.255.255 are

- A. Reserved for loopback
- B. Reserved for broadcast
- C. Used for multicast packets
- D. Reserved for future addressing

isro2007 computer-networks subnetting

[Answer key](#)

#### 4.30.5 Subnetting: ISRO2008-3 [top](#)



The subnet mask 255.255.255.192

- A. extends the network portion to 16 bits
- B. extends the network portion to 26 bits
- C. extends the network portion to 36 bits
- D. has no effect on the network portion of an IP address

isro2008 computer-networks subnetting

[Answer key](#)

#### 4.30.6 Subnetting: ISRO2011-45 [top](#)



The broadcast address for IP network 172.16.0.0 with subnet mask 255.255.0.0 is

- A. 172.16.0.255
- B. 172.16.255.255
- C. 255.255.255.255
- D. 172.255.255.255

isro2011 computer-networks subnetting

[Answer key](#)

#### 4.30.7 Subnetting: ISRO2014-75 [top](#)



An organization is granted the block 130.34.12.64/26. It needs to have 4 subnets.  
Which of the following is not an address of this organization?

- A. 130.34.12.124
- B. 130.34.12.89
- C. 130.34.12.70
- D. 130.34.12.132

computer-networks subnetting isro2014

[Answer key](#)

#### 4.30.8 Subnetting: ISRO2015-54 [top](#)



In a class B subnet, we know the IP address of one host and the mask as given below:

IP address: 125.134.112.66

Mask: 255.255.224.0

What is the first address(Network address)?

- A. 125.134.96.0
- B. 125.134.112.0
- C. 125.134.112.66
- D. 125.134.0.0

isro2015 computer-networks subnetting

[Answer key](#)

#### 4.30.9 Subnetting: ISRO2017-29 [top](#)



The default subnet mask for a class B network can be

- A. '255.255.255.0
- B. 255.0.0.0
- C. 255.255.192.0
- D. 255.255.0.0

[Answer key](#)**4.31****Supernetting (1)** [top](#)**4.31.1 Supernetting: ISRO2014-57** [top](#)

A supernet has a first address of 205.16.32.0 and a supernet mask of 255.255.248.0. A router receives 4 packets with the following destination addresses. which packet belongs to this supernet?

- A. 205.16.42.56
- B. 205.17.32.76
- C. 205.16.31.10
- D. 205.16.39.44

[Answer key](#)**4.32****Tcp (5)** [top](#)**4.32.1 Tcp: ISRO2014-60** [top](#)

Suppose you are browsing the world wide web using a web browser and trying to access the web servers. What is the underlying protocol and port number that are being used?

- A. UDP, 80
- B. TCP, 80
- C. TCP, 25
- D. UDP, 25

[Answer key](#)**4.32.2 Tcp: ISRO2015-50** [top](#)

How many bits internet address is assigned to each host on a TCP/IP internet which is used in all communication with the host?

- A. 16 bits
- B. 32 bits
- C. 48 bits
- D. 64 bits

[Answer key](#)**4.32.3 Tcp: ISRO2015-53** [top](#)

An ACK number of 1000 in TCP always means that

- |   |   |
|---|---|
| A. 999 bytes have been successfully received  | B. 1000 bytes have been successfully received |
| C. 1001 bytes have been successfully received | D. None of the above                          |

[Answer key](#)**4.32.4 Tcp: ISRO2020-53** [top](#)

The persist timer is used in TCP to

- A. To detect crashes from the other end of the connection
- B. To enable retransmission
- C. To avoid deadlock condition
- D. To timeout FIN\_WAIT1 condition

isro-2020 computer-networks tcp normal

Answer key 

#### 4.32.5 Tcp: ISRO2020-54 [top](#)

Checksum field in TCP header is

- A. ones complement of sum of header and data in bytes
- B. ones complement of sum of header, data and pseudo header in 16 bit words
- C. dropped from IPv6 header format
- D. better than md5 or sh1 methods

isro-2020 computer-networks tcp normal

Answer key 

#### 4.33

#### Token Ring (1) [top](#)

##### 4.33.1 Token Ring: GATE CSE 2007 | Question: 66, ISRO2016-71 [top](#)

In a token ring network the transmission speed is  $10^7$  bps and the propagation speed is 200 meters/ $\mu$ s. The 1-bit delay in this network is equivalent to:

- A. 500 meters of cable.
- B. 200 meters of cable.
- C. 20 meters of cable.
- D. 50 meters of cable.

gatecse-2007 computer-networks token-ring out-of-syllabus-now isro2016

Answer key 

#### 4.34

#### Transport Layer (1) [top](#)

##### 4.34.1 Transport Layer: ISRO2018-45 [top](#)

Assuming that for a given network layer implementation, connection establishment overhead is 100 bytes and disconnection overhead is 28 bytes. What would be the minimum size of the packet the transport layer needs to keep up, if it wishes to implement a datagram service above the network layer and needs to keep its overhead to a minimum of 12.5%. (ignore transport layer overhead)

- a. 512 bytes
- b. 768 bytes
- c. 1152 bytes
- d. 1024 bytes

isro2018 transport-layer

Answer key 

#### 4.35

#### Wifi (2) [top](#)

##### 4.35.1 Wifi: ISRO2017-32 [top](#)

Which media access control protocol is used by IEEE 802.11 wireless LAN?

- A. CDMA      B. CSMA/CA      C. ALOHA      D. None of the above

isro2017 computer-networks wifi

[Answer key](#)



#### 4.35.2 Wifi: ISRO2017-38 [top](#)

What is WPA?

- A. wired protected access  
C. wired process access  
B. wi-fi protected access  
D. wi-fi process access

isro2017 computer-networks wifi

[Answer key](#)

### 4.36

#### Wimax (1) [top](#)



#### 4.36.1 Wimax: ISRO2011-20 [top](#)

The IEEE standard for WiMax technology is

- A. IEEE 802.16    B. IEEE 802.36    C. IEEE 812.16    D. IEEE 806.16

isro2011 non-gate computer-networks wimax

[Answer key](#)

### 4.37

#### Wireless Networks (1) [top](#)



#### 4.37.1 Wireless Networks: ISRO2007-74 [top](#)

IEEE 802.11 is standard for

- A. Ethernet    B. Bluetooth    C. Broadband Wireless LANs

isro2007 computer-networks wireless-networks

[Answer key](#)

## Answer Keys

4.0.1	Q-Q	4.0.2	C	4.0.3	C	4.0.4	Q-Q	4.0.5	A
4.0.6	C	4.0.7	Q-Q	4.0.8	D	4.0.9	B	4.0.10	Q-Q
4.0.11	Q-Q	4.0.12	B	4.0.13	Q-Q	4.0.14	Q-Q	4.0.15	Q-Q
4.0.16	C	4.0.17	Q-Q	4.0.18	Q-Q	4.1.1	A	4.2.1	A
4.3.1	D	4.3.2	C	4.3.3	A	4.3.4	C	4.3.5	D
4.3.6	D	4.3.7	D	4.4.1	B	4.4.2	B	4.4.3	B
4.5.1	B	4.5.2	C	4.5.3	A	4.5.4	B	4.6.1	A
4.6.2	C	4.7.1	C	4.7.2	C	4.8.1	D	4.9.1	C
4.10.1	A	4.11.1	A	4.11.2	B	4.11.3	D	4.11.4	D

4.12.1	A
4.15.1	C
4.20.1	B
4.21.3	D
4.22.1	D
4.22.6	D
4.22.11	A
4.25.2	D
4.28.1	D
4.30.3	C
4.30.8	A
4.32.3	D
4.35.1	B

4.13.1	A
4.16.1	B
4.20.2	D
4.21.4	B
4.22.2	D
4.22.7	A
4.23.1	B
4.26.1	D
4.28.2	A
4.30.4	C
4.30.9	D
4.32.4	C
4.35.2	B

4.14.1	B
4.17.1	D
4.20.3	A
4.21.5	B
4.22.3	B
4.22.8	A
4.23.2	A
4.26.2	D
4.28.3	B
4.30.5	B
4.31.1	D
4.32.5	B;C
4.36.1	A

4.14.2	C
4.18.1	B
4.21.1	D
4.21.6	A
4.22.4	C
4.22.9	C
4.24.1	C
4.27.2	C
4.29.1	B
4.30.6	B
4.32.1	B
4.33.1	C
4.37.1	D

4.14.3	D
4.19.1	D
4.21.2	C
4.21.7	D
4.22.5	D
4.22.10	B
4.25.1	B
4.27.3	A
4.30.1	D
4.30.7	D
4.32.2	B
4.34.1	D


**5.0.1 ISRO2009-70** top ↗


A locked database file can be

- A. Accessed by only one user
- B. Modified by users with the correct password
- C. Used to hide sensitive information
- D. Updated by more than one user

isro2009 databases

**Answer key**

**5.0.2 ISRO2017-4** top ↗


What does a data dictionary will identify?

- A. Field name
- B. Field format
- C. Field types
- D. All of the above

isro2017 databases

**Answer key**

**5.0.3 ISRO2011-21** top ↗


Which type of DBMS provides support for maintaining several versions of the same entity?

- A. Relational Database Management System
- B. Hierarchical
- C. Object Oriented Database Management System
- D. Network

isro2011 databases

**Answer key**

**5.0.4 ISRO2009-71** top ↗


Which of the following contains complete record of all activity that affected the contents of a database during a certain period of time?

- A. Transaction log
- B. Query language
- C. Report writer
- D. Data manipulation language

isro2009 databases

**Answer key**

**5.0.5 ISRO2020-22** top ↗


Raymonds tree based algorithm ensures

- A. no starvation, but deadlock may occur in rare cases
- B. no deadlock, but starvation may occur
- C. neither deadlock nor starvation can occur
- D. deadlock may occur in cases where the process is already starved

isro-2020 databases normal

Answer key 

### 5.0.6 ISRO2018-53 [top](#)

Immunity of the external schemas (or application programs) to changes in the conceptual scheme is referred to as:

- a. Physical Data Independence
- b. Logical Data Independence
- c. Both (a) and (b)
- d. None of the above

isro2018 databases

Answer key 

### 5.0.7 ISRO2009-69 [top](#)

The 'command' used to change contents of one database using the contents of another database by linking them on a common key field?

- A. Replace
- B. Join
- C. Change
- D. Update

isro2009 databases bad-question

Answer key 

### 5.0.8 ISRO2014-11 [top](#)

An aggregation association is drawn using which symbol?

- A. A line which loops back on to the same table
- B. A small open diamond at the end of a line connecting two tables
- C. A small closed diamond at the end of a line connecting two tables
- D. A small closed triangle at the end of a line connecting two tables

isro2014 databases

Answer key 

### 5.0.9 ISRO2016-56 [top](#)

Goals for the design of the logical scheme include

- A. avoiding data inconsistency
- B. being able to construct query easily
- C. being able to access data efficiently
- D. All of the above

isro2016 databases

Answer key 

### 5.0.10 ISRO2007-50 [top](#)

A view of database that appears to an application program is known as

- A. Schema
- B. Subschema
- C. Virtual table
- D. None of these

[Answer key](#)**5.1****B Tree (4)** [top](#)**5.1.1 B Tree: GATE CSE 2007 | Question: 63, ISRO2016-59 [top](#)**

The order of a leaf node in a  $B^+$  - tree is the maximum number of (value, data record pointer) pairs it can hold. Given that the block size is  $1K$  bytes, data record pointer is 7 bytes long, the value field is 9 bytes long and a block pointer is 6 bytes long, what is the order of the leaf node?

- A. 63      B. 64      C. 67      D. 68

[Answer key](#)**5.1.2 B Tree: GATE IT 2005 | Question: 23, ISRO2017-67** [top](#)

A B-Tree used as an index for a large database table has four levels including the root node. If a new key is inserted in this index, then the maximum number of nodes that could be newly created in the process are

- A. 5      B. 4      C. 3      D. 2

[Answer key](#)**5.1.3 B Tree: ISRO2015-39** [top](#)

If a node has  $K$  children in  $B$  tree, then the node contains exactly \_\_\_\_\_ keys.

- A.  $K^2$       B.  $K - 1$       C.  $K + 1$       D.  $\sqrt{K}$

[Answer key](#)**5.1.4 B Tree: ISRO2018-49** [top](#)

in a file which contains 1 million records and the order of the tree is 100, then what is the maximum number of nodes to be accessed if  $B^+$  tree index is used?

- a. 5      b. 4      c. 3      d. 10

[Answer key](#)**5.2****Candidate Key (1)** [top](#)**5.2.1 Candidate Key: ISRO2014-42** [top](#)

Let  $x, y, z, a, b, c$  be the attributes of an entity set E. If  $\{x\}, \{x, y\}, \{a, b\}, \{a, b, c\}, \{x, y, z\}$  are superkeys then which of the following

are the candidate keys?

- A.  $\{x, y\}$  and  $\{a, b\}$
- B.  $\{x\}$  and  $\{a, b\}$
- C.  $\{x, y, z\}$  and  $\{a, b, c\}$  and  $\{c\}$

databases candidate-key isro2014

[Answer key](#)

## 5.3

### Database Normalization (12) [top](#)



#### 5.3.1 Database Normalization: ISRO2007-51 [top](#)

Armstrong's inference rule does not determine

- A. Reflexivity
- B. Augmentation
- C. Transitivity
- D. Mutual dependency

isro2007 databases database-normalization

[Answer key](#)



#### 5.3.2 Database Normalization: ISRO2007-54 [top](#)

BCNF is not used for cases where a relation has

- A. Two (or more) candidate keys
- B. Two candidate keys and composite
- C. The candidate key overlap
- D. Two mutually exclusive foreign keys

isro2007 databases database-normalization

[Answer key](#)



#### 5.3.3 Database Normalization: ISRO2011-29 [top](#)

Which normal form is based on the concept of 'full functional dependency' is

- A. First Normal Form
- B. Second Normal Form
- C. Third Normal Form
- D. Fourth Normal Form

isro2011 databases database-normalization

[Answer key](#)



#### 5.3.4 Database Normalization: ISRO2011-53 [top](#)

In functional dependency Armstrong inference rules refers to

- A. Reflexive, Augmentation and Decomposition
- B. Transitive, Augmentation and Reflexive
- C. Augmentation, Transitive, Reflexive and Decomposition
- D. Reflexive, Transitive and Decomposition

isro2011 databases database-normalization

[Answer key](#)



#### 5.3.5 Database Normalization: ISRO2014-22 [top](#)

Consider the schema  $R(A, B, C, D)$  and the functional dependencies  $A \rightarrow B$  and

$C \rightarrow D$ . If the decomposition is made as  $R_1(A, B)$  and  $R_2(C, D)$ , then which of the following is TRUE?

- A. Preserves dependency but cannot perform lossless join
- B. Preserves dependency and performs lossless join
- C. Does not perform dependency and cannot perform lossless join
- D. Does not preserve dependency but perform lossless join

databases isro2014 database-normalization

Answer key 

### 5.3.6 Database Normalization: ISRO2014-30 [top](#)

Every time the attribute A appears, it is matched with the same value of attribute B but not the same value of attribute C. Which of the following is true?

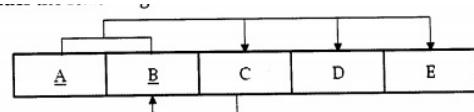
- A.  $A \rightarrow (B, C)$
- B.  $A \rightarrow B, A \rightarrow> C$
- C.  $A \rightarrow B, C \rightarrow> A$
- D.  $A \rightarrow> B, B \rightarrow C$

databases database-normalization isro2014

Answer key 

### 5.3.7 Database Normalization: ISRO2014-63 [top](#)

Consider the following table



The table is in which normal form?

- A. First Normal Form
- B. Second Normal Form
- C. Third Normal Form but not BCNF
- D. Third Normal Form and BCNF

isro2014 databases database-normalization

Answer key 

### 5.3.8 Database Normalization: ISRO2015-20 [top](#)

Let  $R = (A, B, C, D, E, F)$  be a relation scheme with the following dependencies  $C \rightarrow F, E \rightarrow A, EC \rightarrow D, A \rightarrow B$ . Which of the following is a key of  $R$ ?

- A. CD
- B. EC
- C. AE
- D. AC

isro2015 databases database-normalization

Answer key 

### 5.3.9 Database Normalization: ISRO2018-41 [top](#)

For a database relation  $R(a, b, c, d)$  where the domain of  $a, b, c$  and  $d$  include only atomic values, only the following functional dependencies and those that can be inferred from them hold

$$a \rightarrow c$$

$b \rightarrow d$

The relation is in:

- a. First normal form but not in second normal form
- b. Second normal form but not in third normal form
- c. Third normal form
- d. None of the above

isro2018 databases database-normalization databases

[Answer key](#)



### 5.3.10 Database Normalization: ISRO2018-5 [top](#)

Considering the following table in a relational database :

Last Name	Rank	Room	shift
Smith	Manager	234	Morning
Jones	Custodian	33	Afternoon
Smith	Custodian	33	Evening
Doe	Clerical	222	Morning

According to the data shown in the table, which of the following could be a candidate key of the table?

- a. {Last Name}
- b. {Room}
- c. {Shift}
- d. {Room, Shift}

isro2018 databases database-normalization

[Answer key](#)



### 5.3.11 Database Normalization: ISRO2018-54 [top](#)

The set of attributes  $X$  will be fully functionally dependent on the set of attributes  $Y$  if the following conditions are satisfied.

- a.  $X$  is functionally dependent on  $Y$
- b.  $X$  is not functionally dependent on any subset of  $Y$
- c. Both (a) and (b)
- d. None of these

isro2018 databases database-normalization

[Answer key](#)



### 5.3.12 Database Normalization: ISRO2020-50 [top](#)

If every non-key attribute functionally dependent on the primary key, then the relation will be in

- A. First normal form
- B. Second normal form
- C. Third normal form
- D. Fourth Normal form

isro-2020 databases database-normalization easy

[Answer key](#)

5.4

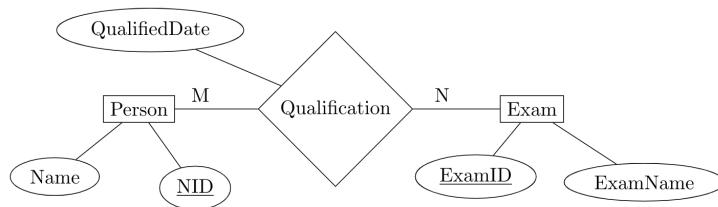
Er Diagram (3) [top](#)



### 5.4.1 Er Diagram: ISRO2015-16 top ↗



Consider the following Relationship Entity Diagram(ERP)



Which of the following possible relations will not hold if the above ERD is mapped into a relation model?

- A. Person (NID, Name)
- B. Qualification (NID, QualifiedDate)
- C. Exam (ExamID, NID, ExamName)
- D. Exam (ExamID, ExamName)

isro2015 databases er-diagram

Answer key

### 5.4.2 Er Diagram: ISRO2017-8 top ↗



Which symbol denote derived attributes in ER Model?

- A. Double ellipse
- B. Dashed ellipse
- C. Squared ellipse
- D. Ellipse with attribute name underlined

isro2017 databases er-diagram

Answer key

### 5.4.3 Er Diagram: ISRO2018-52 top ↗



In  $E - R$  model,  $Y$  is the dominant entity and  $X$  is subordinate entity

- a. If  $X$  is deleted, then  $Y$  is also deleted
- b. If  $Y$  is deleted, then  $X$  is also deleted
- c. If  $Y$  is deleted, then  $X$  is not deleted
- d. None of the above

isro2018 er-diagram databases

Answer key

## 5.5

### File (1) top ↗



### 5.5.1 File: ISRO2015-13 top ↗

Six files F1, F2, F3, F4, F5 and F6 have 100, 200, 50, 80, 120, 150 records respectively. In what order should they be stored so as to optimize access. Assume each file is accessed with the same frequency

- A. F3, F4, F1, F5, F6, F2
- B. F2, F6, F5, F1, F4, F3
- C. F1, F2, F3, F4, F5, F6

D. Ordering is immaterial as all files are accessed with the same frequency.

isro2015 file

Answer key 

5.6

Indexing (3) 

#### 5.6.1 Indexing: GATE CSE 2008 | Question: 16, ISRO2016-60



A clustering index is defined on the fields which are of type

- A. non-key and ordering
- B. non-key and non-ordering
- C. key and ordering
- D. key and non-ordering

gatcse-2008 easy databases indexing isro2016

Answer key 

#### 5.6.2 Indexing: ISRO2015-18



Given a block can hold either 3 records or 10 key pointers. A database contains  $n$  records, then how many blocks do we need to hold the data file and the dense index

- A.  $13n/30$
- B.  $n/3$
- C.  $n/10$
- D.  $n/30$

isro2015 databases indexing

Answer key 

#### 5.6.3 Indexing: ISRO2018-51



Which of the following is dense index?

- A. Primary index
- B. Clustered index
- C. Secondary index
- D. Secondary non-key index

isro2018 indexing

Answer key 

5.7

Physical Storage (1) 

#### 5.7.1 Physical Storage: ISRO-2013-61, ISRO2008-35



Embedded pointer provides

- A. A secondary access path
- B. A physical record key
- C. An inverted index
- D. A primary key

isro2013 databases physical-storage isro2008

Answer key 

5.8

Raid (2) 

#### 5.8.1 Raid: ISRO2011-46



Which RAID level gives block level striping with double distributed parity?

- A. RAID 10      B. RAID 2      C. RAID 6      D. RAID 5

isro2011 raid

Answer key 

### 5.8.2 Raid: ISRO2017-45 [top](#)

Which of these is characteristic of RAID 5?

- A. Dedicated parity      B. Double parity  
C. Hamming code parity      D. Distributed parity

isro2017 databases raid non-gate

Answer key 

5.9

## Referential Integrity (2) [top](#)

### 5.9.1 Referential Integrity: GATE CSE 1997 | Question: 6.10, ISRO2016-54 [top](#)

Let  $R(a, b, c)$  and  $S(d, e, f)$  be two relations in which  $d$  is the foreign key of  $S$  that refers to the primary key of  $R$ . Consider the following four operations  $R$  and  $S$

- I. Insert into  $R$
- II. Insert into  $S$
- III. Delete from  $R$
- IV. Delete from  $S$

Which of the following can cause violation of the referential integrity constraint above?

- A. Both I and IV      B. Both II and III      C. All of these      D. None of these

gate1997 databases referential-integrity easy isro2016

Answer key 

### 5.9.2 Referential Integrity: ISRO2009-72 [top](#)

Purpose of 'Foreign Key' in a table is to ensure

- A. Null Integrity      B. Referential Integrity  
C. Domain Integrity      D. Null and Domain Integrity

isro2009 databases referential-integrity

Answer key 

5.10

## Relational Algebra (4) [top](#)

### 5.10.1 Relational Algebra: GATE CSE 1999 | Question: 1.18, ISRO2016-53 [top](#)

Consider the join of a relation  $R$  with a relation  $S$ . If  $R$  has  $m$  tuples and  $S$  has  $n$  tuples then the maximum and minimum sizes of the join respectively are

- A.  $m + n$  and 0      B.  $mn$  and 0      C.  $m + n$  and  $|m \times n|$       D.  $m + n$  and  $m + n$

gate1999 databases relational-algebra easy isro2016

[Answer key](#)

## 5.10.2 Relational Algebra: GATE CSE 2000 | Question: 1.23, ISRO2016-57 [top](#)



Given the relations

- employee (name, salary, dept-no), and
- department (dept-no, dept-name, address),

Which of the following queries cannot be expressed using the basic relational algebra operations ( $\sigma, \pi, \times, \bowtie, \cup, \cap, -$ )?

- A. Department address of every employee
- B. Employees whose name is the same as their department name
- C. The sum of all employees' salaries
- D. All employees of a given department

gatecse-2000 databases relational-algebra easy isro2016

[Answer key](#)

## 5.10.3 Relational Algebra: ISRO2007-52 [top](#)



Which operation is used to extract specified columns from a table?

- A. Project
- B. Join
- C. Extract
- D. Substitute

isro2007 databases relational-algebra

[Answer key](#)

## 5.10.4 Relational Algebra: ISRO2008-33 [top](#)



The join operation can be defined as

- A. a cartesian product of two relations followed by a selection
- B. a cartesian product of two relations
- C. a union of two relations followed by cartesian product of the two relations
- D. a union of two relations

isro2008 databases relational-algebra

[Answer key](#)

## 5.11

## Relations (1) [top](#)



### 5.11.1 Relations: ISRO2015-21 [top](#)

If  $D_1, D_2, \dots, D_n$  are domains in a relational model, then the relation is a table, which is a subset of

- A.  $D_1 \oplus D_2 \oplus \dots \oplus D_n$
- B.  $D_1 \times D_2 \times \dots \times D_n$
- C.  $D_1 \cup D_2 \cup \dots \cup D_n$
- D.  $D_1 \cap D_2 \cap \dots \cap D_n$

databases relations isro2015

[Answer key](#)

5.12

[Sql \(11\)](#) [top](#)

### 5.12.1 Sql: GATE CSE 2005 | Question: 77, ISRO2016-55 [top](#)



The relation **book** (**title**, **price**) contains the titles and prices of different books. Assuming that no two books have the same price, what does the following SQL query list?

```
select title  
from book as B  
where (select count(*)  
      from book as T  
     where T.price>B.price) < 5
```

- A. Titles of the four most expensive books
- B. Title of the fifth most inexpensive book
- C. Title of the fifth most expensive book
- D. Titles of the five most expensive books

gatecse-2005 databases sql easy isro2016

[Answer key](#)

### 5.12.2 Sql: ISRO2007-47 [top](#)



Which commands are used to control access over objects in relational database?

- A. CASCADE & MVD
- B. GRANT & REVOKE
- C. QUE & QUIST
- D. None of these

isro2007 databases sql

[Answer key](#)

### 5.12.3 Sql: ISRO2007-48 [top](#)



Which of the following is aggregate function in SQL?

- A. Avg
- B. Select
- C. Ordered by
- D. distinct

isro2007 databases sql

[Answer key](#)

### 5.12.4 Sql: ISRO2015-19 [top](#)



The maximum length of an attribute of type text is

- A. 127
- B. 255
- C. 256
- D. It is variable

isro2015 databases sql

[Answer key](#)

### 5.12.5 Sql: ISRO2015-22 top



Consider the following relational query on the above database:

```
SELECT S.name FROM Suppliers S  
Where S.sid NOT IN (SELECT C.sid FROM Catalog C  
WHERE C.pid NOT IN (SELECT P.pid FROM Parts P WHERE P.color <>'blue'))
```

- A. Find the names of all suppliers who have supplied non-blue part.
- B. Find the names of all suppliers who have not supplied non-blue part.
- C. Find the names of all suppliers who have supplied only non-blue parts
- D. Find the names of all suppliers who have not supplied only non-blue part.

isro2015 databases sql ambiguous

Answer key

### 5.12.6 Sql: ISRO2015-23 top



Consider the following schema:

Emp (Empcode, Name, Sex, Salary, Deptt)

A simple SQL query is executed as follows:

```
SELECT Deptt FROM Emp  
GROUP by Deptt  
Having avg (Salary) > {select avg (Salary) from Emp}
```

The output will be

- A. Average salary of male employee is the average salary of the organization
- B. Average salary of male employee is less than the average salary of the organization
- C. Average salary of male employee is equal to the average salary of the organization
- D. Average salary of male employee is more than the average salary of the organization

isro2015 databases sql

Answer key

### 5.12.7 Sql: ISRO2017-7 top



Employee	Department	OT_allowance
RAMA	Mechanical	5000
GOPI	Electrical	2000
SINDHU	Computer	4000
MAHESH	Civil	1500

What is the output of the following SQL query?

```
select count(*) from  
(select Employee, Department from Overtime_allowance)  
natural join
```

```
(select Department, OT_allowance from Overtime_allowance  
as T);
```

- A. 16      B. 4      C. 8      D. None of the above

isro2017 databases sql

Answer key 

#### 5.12.8 Sql: ISRO2018-40 top ↗



Given relations  $R(w, x)$  and  $S(y, z)$ , the result of

`SELECT DISTINCT w, x`

`FROM R, S`

Is guaranteed to be same as R, if

- a. R has no duplicates and S is non-empty
- b. R and S have no duplicates
- c. S has no duplicates and R is non-empty
- d. R and S have the same number of tuples

isro2018 sql databases

Answer key 

#### 5.12.9 Sql: ISRO2018-42 top ↗



Consider the set of relations given below and the SQL query that follows:

Students: (Roll\_number, Name, Date\_of\_birth )

Coursed: (Course\_number, Course\_name, Instructor )

Grades: (Roll\_number, Course\_number, Grade)

`SELECT DISTINCT Name`

`FROM Students, Courses, Grades`

`WHERE Students.Roll_number = Grades.Roll_number`

AND Courses.Instructor =Sriram  
AND Courses.Course\_number = Grades.Course\_number  
AND Grades.Grade = A

Which of the following sets is computed by the above query?

- a. Names of Students who have got an A grade in all courses taught by Sriram
- b. Names of Students who have got an A grade in all courses
- c. Names of Students who have got an A grade in at least one of the courses taught by Sriram
- d. None of the above

isro2018 sql databases

Answer key 

### 5.12.10 Sql: ISRO2020-48 [top](#)



Properties of ‘DELETE’ and ‘TRUNCATE’ commands indicate that

- A. After the execution of ‘TRUNCATE’ operation, COMMIT, and ROLLBACK statements cannot be performed to retrieve the lost data, while ‘DELETE’ allow it
- B. After the execution of ‘DELETE’ and ‘TRUNCATE’ operation retrieval is easily possible for the lost data
- C. After the execution of ‘DELETE’ operation, COMMIT and ROLLBACK statements can be performed to retrieve the lost data, while TRUNCATE do not allow it
- D. After the execution of ‘DELETE’ and ‘TRUNCATE’ operation no retrieval is possible for the lost data

isro-2020 databases sql normal

[Answer key](#)



### 5.12.11 Sql: ISRO2020-51 [top](#)

The SQL query

```
SELECT columns  
FROM TableA  
RIGHT OUTER JOIN TableB  
ON A.columnName = B.columnName  
WHERE A.columnName IS NULL
```

returns the following:

- A. All rows in Table *B*, which meets equality condition above and, none from Table *A* which meets the condition.
- B. All rows in Table *A*, which meets equality condition above and none from Table *B*, which meets the condition.
- C. All rows in Table *B*, which meets the equality condition
- D. All rows in Table *A*, which meets the equality condition

isro-2020 databases sql normal

[Answer key](#)

## 5.13

### Transaction And Concurrency (6) [top](#)



#### 5.13.1 Transaction And Concurrency: GATE CSE 2003 | Question: 29, ISRO2009-73 [top](#)

Which of the following scenarios may lead to an irrecoverable error in a database system?

- A. A transaction writes a data item after it is read by an uncommitted transaction
- B. A transaction reads a data item after it is read by an uncommitted transaction
- C. A transaction reads a data item after it is written by a committed transaction
- D. A transaction reads a data item after it is written by an uncommitted transaction

gatecse-2003 databases transaction-and-concurrency easy isro2009

[Answer key](#)

### 5.13.2 Transaction And Concurrency: GATE CSE 2006 | Question: 20, ISRO2015-17 [top](#)



Consider the following log sequence of two transactions on a bank account, with initial balance 12000, that transfer 2000 to a mortgage payment and then apply a 5% interest.

1. T1 start
2. T1 B old = 12000 new = 10000
3. T1 M old = 0 new = 2000
4. T1 commit
5. T2 start
6. T2 B old = 10000 new = 10500
7. T2 commit

Suppose the database system crashes just before log record 7 is written. When the system is restarted, which one statement is true of the recovery procedure?

- A. We must redo log record 6 to set B to 10500
- B. We must undo log record 6 to set B to 10000 and then redo log records 2 and 3
- C. We need not redo log records 2 and 3 because transaction T1 has committed
- D. We can apply redo and undo operations in arbitrary order because they are idempotent

gatecse-2006 databases transaction-and-concurrency normal isro2015

[Answer key](#)

### 5.13.3 Transaction And Concurrency: ISRO2007-60 [top](#)



Which of the following is correct with respect to Two phase commit protocol?

- |                            |                          |
|----------------------------|--------------------------|
| A. Ensures serializability | B. Prevents Deadlock     |
| C. Detects Deadlock        | D. Recover from Deadlock |

isro2007 databases transaction-and-concurrency

[Answer key](#)

### 5.13.4 Transaction And Concurrency: ISRO2011-15 [top](#)



What is the equivalent serial schedule for the following transactions?

Transaction	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
	R(X) W(X)		R(Y) R(Z)
			W(Y) W(Z)
	R(Y) W(Y)	W(Z)	
		R(Y) W(Y)	R(X) W(X)

- A. T<sub>1</sub> – T<sub>2</sub> – T<sub>3</sub>
- B. T<sub>3</sub> – T<sub>1</sub> – T<sub>2</sub>
- C. T<sub>2</sub> – T<sub>1</sub> – T<sub>3</sub>
- D. T<sub>1</sub> – T<sub>3</sub> – T<sub>2</sub>

**Answer key****5.13.5 Transaction And Concurrency: ISRO2017-6**

ACID properties of a transactions are

- A. Atomicity, consistency, isolation, database
- B. Atomicity, consistency, isolation, durability
- C. Atomicity, consistency, integrity, durability
- D. Atomicity, consistency, integrity, database

**Answer key****5.13.6 Transaction And Concurrency: ISRO2018-55**

Let us assume that transaction  $T_1$  has arrived before transaction  $T_2$ . Consider the schedule  $s = r1(A); r2(B) : w2(A); w1(B)$

Which of the following is true?

- a. Allowed under basic timestamp protocol.
- b. Not allowed under basic timestamp protocols because  $T_1$  is rolled back.
- c. Not allowed under basic timestamp protocols because  $T_2$  is rolled back.
- d. None of these

**Answer key****5.14****Trigger (1)****5.14.1 Trigger: ISRO2016-58**

Trigger is

- A. Statement that enables to start any DBMS
- B. Statement that is executed by the user when debugging an application program
- C. The condition that the system tests for the validity of the database user
- D. Statement that is executed automatically by the system as a side effect of a modification of the database

**Answer key****Answer Keys**

5.0.1

A

5.0.2

D

5.0.3

C

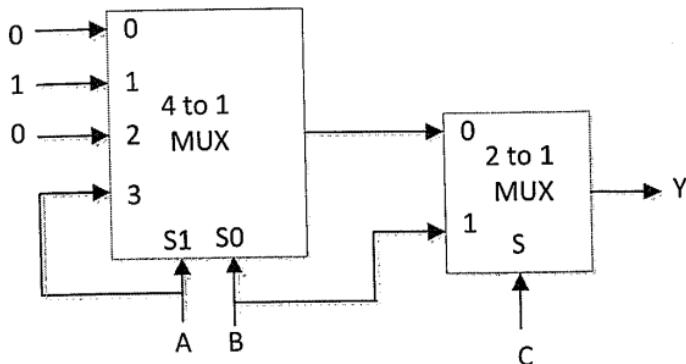
5.0.4

A

5.0.5

B

5.0.6	B	5.0.7	B	5.0.8	B	5.0.9	D	5.0.10	B
5.1.1	A	5.1.2	A	5.1.3	B	5.1.4	B	5.2.1	B
5.3.1	D	5.3.2	Q-Q	5.3.3	B	5.3.4	B	5.3.5	A
5.3.6	B	5.3.7	C	5.3.8	B	5.3.9	A	5.3.10	D
5.3.11	C	5.3.12	C	5.4.1	C	5.4.2	B	5.4.3	B
5.5.1	A	5.6.1	A	5.6.2	A	5.6.3	C	5.7.1	A
5.8.1	C	5.8.2	D	5.9.1	B	5.9.2	B	5.10.1	B
5.10.2	C	5.10.3	A	5.10.4	A	5.11.1	B	5.12.1	D
5.12.2	B	5.12.3	A	5.12.4	D	5.12.5	X	5.12.6	D
5.12.7	B	5.12.8	A	5.12.9	C	5.12.10	A;C	5.12.11	A
5.13.1	D	5.13.2	B	5.13.3	A	5.13.4	B	5.13.5	B
5.13.6	B	5.14.1	D						

6.0.1 ISRO2014-ECE Digital logic [top](#)

In the following circuit, Y can be expressed as :

- A)  $Y = BC + A$
- B)  $Y = AC' + BC$
- C)  $Y = C$
- D)  $Y = B$

[isro2014-ece](#) [isro-ece](#) [digital-logic](#)

[Answer key](#)

6.0.2 ISRO2009-19 [top](#)

The switching expression corresponding to  $f(A, B, C, D) = \Sigma(1, 4, 5, 9, 11, 12)$  is

- |                           |                         |
|---------------------------|-------------------------|
| A. $BC'D' + A'C'D + AB'D$ | B. $ABC' + ACD + B'C'D$ |
| C. $ACD' + A'BC' + AC'D'$ | D. $A'BD + ACD' + BCD'$ |

[isro2009](#) [digital-logic](#)

[Answer key](#)

6.0.3 ISRO2011-6 [top](#)

Evaluate  $(X \text{ xor } Y) \text{ xor } Y$ ?

- A. All 1's
- B. All 0's
- C. X
- D. Y

[isro2011](#) [digital-logic](#)

[Answer key](#)

6.0.4 ISRO2008-28 [top](#)

Which of the following is not a valid rule of XOR?

- A.  $0 \text{ XOR } 0 = 0$
- B.  $1 \text{ XOR } 1 = 1$
- C.  $1 \text{ XOR } 0 = 1$
- D.  $B \text{ XOR } B = 0$

[isro2008](#) [digital-logic](#)

[Answer key](#)

### 6.0.5 ISRO2020-52 [top](#)



To send same bit sequence, NRZ encoding require

- A. Same clock frequency as Manchester encoding
- B. Half the clock frequency as Manchester encoding
- C. Twice the clock frequency as Manchester encoding
- D. A clock frequency which depend on number of zeroes and ones in the bit sequence

isro-2020 digital-logic normal

[Answer key](#)

### 6.0.6 ISRO2012- ECE Digital logic: ADC [top](#)



The number of comparators needed in a 8 bit flash type ADC is:

- a) 8
- b) 16
- c) 255
- d) 256

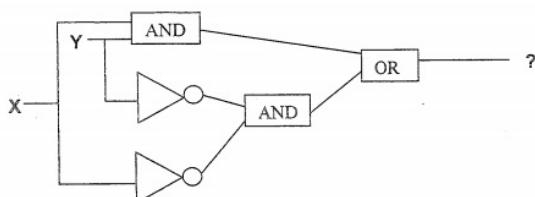
digital-logic isro-ece isro2012-ece

[Answer key](#)

### 6.0.7 ISRO2011-47 [top](#)



The output expression of the following gate network is



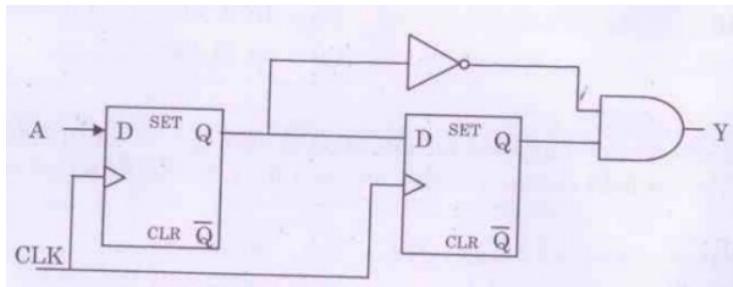
- A.  $X \cdot Y + \bar{X} \cdot \bar{Y}$
- B.  $X \cdot Y + X \cdot \bar{Y}$
- C.  $X \cdot Y$
- D.  $X + Y$

isro2011 digital-logic

[Answer key](#)

### 6.0.8 ISRO2015-EC Flipflop [top](#)





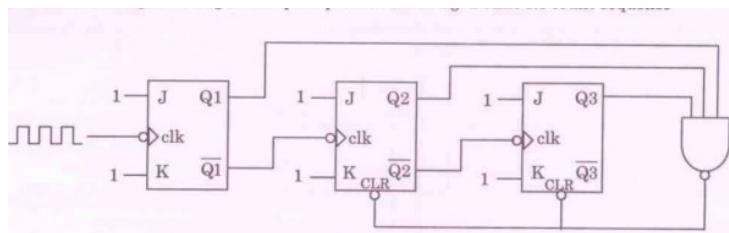
What is the functionality of following digital circuit? A is input data, CLK is system clock and Y is output.

- a) Falling edge detection of input A
- b) Clock division by 2
- c) Rising edge detection of input A
- d) Clock division by 4

isro2015-ece    isro-ece    digital-logic

[Answer key](#)

### 6.0.9 ISRO2016 -EC Digital Logic top



- (a) 000, 001, 010, 011, 100 & repeats
- (b) 100, 011, 010, 001, 000 & repeat
- (c) 010, 011, 100, 000, 001 & repeats
- (d) 101, 110, 111, 000, 001, 010, 011, 100 & repeats

isro2016-ece    isro-ece    digital-logic

### 6.0.10 ISRO2013-ECE: Digotal Logic top



Which of the following is the Boolean function for majority voting, assuming A, B, C are inputs and Y is output?

- a)  $Y = AB + AC + BC$
- b)  $Y = A + B + C$
- c)  $Y = ABC$
- d)  $Y = AB + BC$

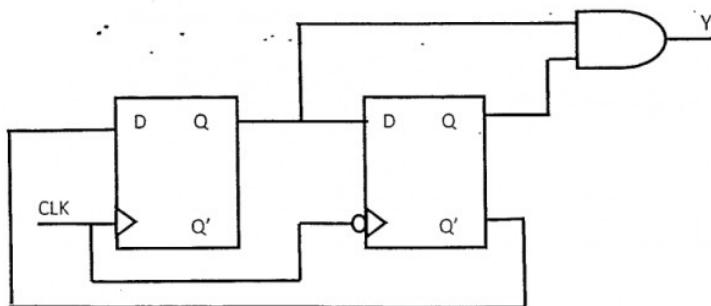
[Answer key](#)**6.0.11 ISRO2008-79** [top](#)

Repeated execution of simple computation may cause compounding of

- A. round-off errors
- B. syntax errors
- C. run-time errors
- D. logic errors

[Answer key](#)**6.0.12 ISRO2013-ECE Digital Logic** [top](#)

What is the frequency and duty cycle of output Y, when CLK frequency is 1MHz @ 50% duty cycle?



- a) 500 KHz @ 50% duty cycle
- b) 500 KHz @ 25% duty cycle
- c) 250 KHz @ 50% duty cycle
- d) 250 KHz @ 25% duty cycle

[Answer key](#)**6.0.13 ISRO2016-ECE Digital logic** [top](#)

Which shift register counter requires the most decoding circuitry?

- A. Johnson Counter
- B. Ring Counter
- C. Ripple Counter
- D. MOD counter

[Answer key](#)**6.0.14 ISRO2016-ECE Digital Logic** [top](#)

Simplify Boolean function represented in sum of product of min-terms,  $F(x, y, z) = \Sigma(0, 2, 4, 5, 6)$

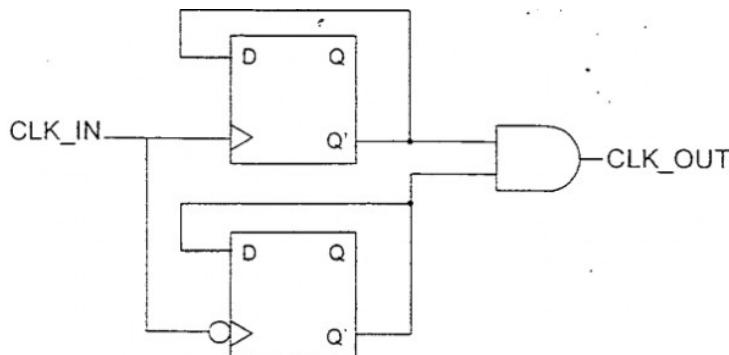
- (a)  $z' + xy'$
- (b)  $x' y'z' + xyz + xy'z'$
- (c)  $xyz + x' + y' + z'$
- (d)  $xy + yz + zx$

**Answer key****6.0.15 ISRO2016-ECE Digital logic**

How is the status of the carry, auxiliary carry and parity flag affected if write instruction?

MOV A,#9C  
ADD A,#64H

- (a) CY=0,AC=0,P=0
- (b) CY=1,AC=1,P=0
- (c) CY=0,AC=1,P=0
- (d) CY = 1, AC = 1, P = 1

**Answer key****6.0.16 ISRO2013-ECE Digital Logic**

What is the division factor of the given clock divider circuit?

- a) 2
- b) 3
- c) 1.5
- d) 2.5

**Answer key****6.0.17 ISRO2016-ECE Digital Logic**

A 10-bit DAC has a step size of 10mV.

What is its Full scale O/P voltage and the percentage resolution?

- (a) 10.24V, 0.2%
- (b) 10.23V, 0.5%
- (c) 10.23V, 0.1%
- (d) 10.24V, 0.1%

[Answer key](#)

### 6.0.18 ISRO2013-ECE Digital Logic [top](#)



If a counter having 10 flip flops is initially at 0, what count will it hold after 2060 pulses?

- a) 000 000 1100
- b) 000 001 1100
- c) 000 001 1000
- d) 000 000 1110

[digital-logic](#) [isro-ece](#) [isro2013-ece](#)

[Answer key](#)

### 6.0.19 ISRO2016-ECE Digital Logic [top](#)



For a 10-bit digital ramp ADC using 500kHz clock, the maximum conversion time is

- (a) 2048  $\mu$  S
- (b) 2046  $\mu$  S
- (c) 2064  $\mu$  S
- (d) 2084  $\mu$  S

[isro2016-ece](#) [digital-logic](#)

[Answer key](#)

### 6.0.20 ISRO2007-49 [top](#)



One approach to handling fuzzy logic data might be to design a computer using ternary (base-3) logic so that data could be stored as “true,” “false,” and “unknown.” If each ternary logic element is called a flit, how many flits are required to represent at least 256 different values?

- A. 4
- B. 5
- C. 6
- D. 7

[isro2007](#) [digital-logic](#)

[Answer key](#)

### 6.0.21 ISRO2016-ECE Digital Logic [top](#)



How many inputs & outputs does a full adder have?

- (a) 3, 2
- (b) 2, 3
- (c) 3, 3
- (d) 2, 2

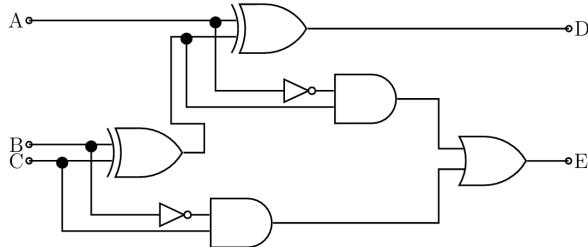
[isro2016-ece](#) [digital-logic](#)

[Answer key](#)

### 6.1.1 Adder: ISRO2007-03 [top](#)



The circuit shown in the given figure is a



- A. full adder
- B. full subtracter
- C. shift register
- D. decade counter

isro2007 digital-logic digital-circuits adder

[Answer key](#)

### 6.1.2 Adder: ISRO2015-7 [top](#)



If half adders and full adders are implements using gates, then for the addition of two 17 bit numbers (using minimum gates) the number of half adders and full adders required will be

- A. 0,17
- B. 16,1
- C. 1,16
- D. 8,8

isro2015 digital-logic adder

[Answer key](#)

### 6.1.3 Adder: ISRO2017-24 [top](#)



When two  $n$ -bit binary numbers are added the sum will contain at the most

- A.  $n$  bits
- B.  $n + 2$  bits
- C.  $n + 3$  bits
- D.  $n + 1$  bits

isro2017 digital-logic adder

[Answer key](#)

## 6.2

### Bcd (1) [top](#)

#### 6.2.1 Bcd: ISRO2014-27 [top](#)



How many different BCD numbers can be stored in 12 switches ? (Assume two position or on-off switches).

- A.  $2^{12}$
- B.  $2^{12} - 1$
- C.  $10^{12}$
- D.  $10^3$

isro2014 digital-logic number-representation bcd

[Answer key](#)

## 6.3

### Binary Codes (3) [top](#)

### 6.3.1 Binary Codes: ISRO2008-48 [top](#)



Which of the following is termed as minimum error code ?

- A. Binary code
- B. Gray code
- C. Excess-3 code
- D. Octal code

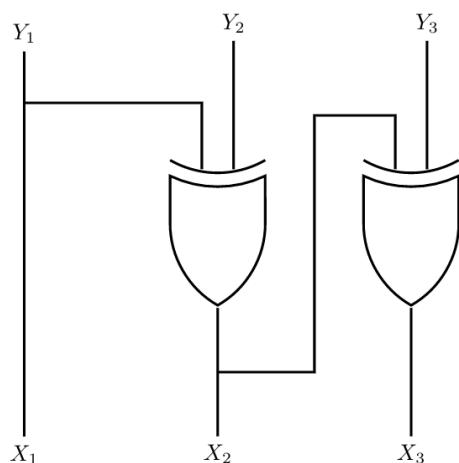
isro2008 digital-logic binary-codes

[Answer key](#)

### 6.3.2 Binary Codes: ISRO2016-12 [top](#)



The logic circuit given below converts a binary code  $Y_1 Y_2 Y_3$  into



- A. Excess-3 code
- B. Gray code
- C. BCD code
- D. Hamming code

digital-logic binary-codes isro2016

[Answer key](#)

### 6.3.3 Binary Codes: ISRO2016-15 [top](#)



The Excess-3 code is also called

- A. Cyclic Redundancy Code
- B. Weighted Code
- C. Self-Complementing Code
- D. Algebraic Code

isro2016 digital-logic binary-codes

[Answer key](#)

## 6.4

### Binary Subtractor (1) [top](#)



#### 6.4.1 Binary Subtractor: ISRO2016-9 [top](#)

For a binary half-subtractor having two inputs A and B, the correct set of logical outputs D( $=A$  minus  $B$ ) and X( $=$ borrow) are

- A.  $D = AB + \bar{A}B, X = \bar{A}B$
- B.  $D = \bar{A}B + A\bar{B}, X = A\bar{B}$
- C.  $D = \bar{A}B + A\bar{B}, X = \bar{A}B$
- D.  $D = AB + \bar{A}B, X = A\bar{B}$

isro2016 digital-logic binary-subtractor

[Answer key](#)

**6.5.1 Boolean Algebra: ISRO2007-01** [top](#)

The Boolean expression  $Y = (A + \bar{B} + \bar{A}B)\bar{C}$  is given by

- A.  $A\bar{C}$
- B.  $B\bar{C}$
- C.  $\bar{C}$
- D.  $AB$

[isro2007](#) [boolean-algebra](#)

[Answer key](#)

**6.5.2 Boolean Algebra: ISRO2008-11** [top](#)

The Boolean theorem  $AB + \bar{A}C + BC = AB + \bar{A}C$  corresponds to

- A.  $(A + B) \bullet (\bar{A} + C) \bullet (B + C) = (A + B) \bullet (\bar{A} + C)$
- B.  $AB + \bar{A}C + BC = AB + BC$
- C.  $AB + \bar{A}C + BC = (A + B) \bullet (\bar{A} + C) \bullet (B + C)$
- D.  $(A + B) \bullet (\bar{A} + C) \bullet (B + C) = AB + \bar{A}C$

[isro2008](#) [digital-logic](#) [boolean-algebra](#)

[Answer key](#)

**6.5.3 Boolean Algebra: ISRO2008-24** [top](#)

The Boolean expression  $(A + \bar{C})(\bar{B} + \bar{C})$  simplifies to

- |                                |                           |
|--------------------------------|---------------------------|
| A. $\bar{C} + A\bar{B}$        | B. $\bar{C}(\bar{A} + B)$ |
| C. $\bar{B}\bar{C} + A\bar{B}$ | D. None of these          |

[isro2008](#) [boolean-algebra](#)

[Answer key](#)

**6.5.4 Boolean Algebra: ISRO2008-25** [top](#)

In the expression  $\bar{A}(\bar{A} + \bar{B})$  by writing the first term  $A$  as  $A+0$ , the expression is best simplified as

- A.  $\text{A}+\text{AB}$
- B.  $\text{AB}$
- C.  $\text{A}$
- D.  $\text{A}+\text{B}$

[isro2008](#) [digital-logic](#) [boolean-algebra](#)

[Answer key](#)

**6.5.5 Boolean Algebra: ISRO2011-30** [top](#)

In Boolean algebra, rule  $(X + Y)(X + Z) =$

- A.  $Y + XZ$       B.  $X + YZ$       C.  $XY + Z$       D.  $XZ + Y$

isro2011 digital-logic boolean-algebra

[Answer key](#)

### 6.5.6 Boolean Algebra: ISRO2012-ECE Boolean Logic [top](#)



C	B	A	F
0	0	0	d
0	0	1	1
0	1	0	1
0	1	1	d
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

The truth table for implementing a Boolean variable F is given where d represents don't care states. The minimized expression for F is:

- A.  $BC' + AC' + AB$   
 B.  $AB + C'$   
 C.  $A'BC' + AB'C' + ABC$   
 D. None of the above

isro-ece isro2012-ece digital-logic boolean-algebra

[Answer key](#)

### 6.5.7 Boolean Algebra: ISRO2014-56 [top](#)



Which of the following is not valid Boolean algebra rule ?

- A.  $X \cdot X = X$       B.  $(X + Y) \cdot X = X$       C.  $\bar{X} + XY = Y$       D.  $(X + Y) \cdot (X + Z) = X + YZ$

digital-logic boolean-algebra isro2014

[Answer key](#)

### 6.5.8 Boolean Algebra: ISRO2015-10 [top](#)



The boolean expression  $AB + AB' + A'C + AC$  is independent of the boolean variable

- A. A      B. B      C. C      D. None of these

isro2015 digital-logic boolean-algebra

[Answer key](#)

### 6.5.9 Boolean Algebra: ISRO2015-5 [top](#)



The complement of the Boolean expression  $AB(\bar{B}C + AC)$  is

- A.  $(\bar{A} + \bar{B}) + (B + \bar{C}) \cdot (\bar{A} + \bar{C})$   
 B.  $(\bar{A} \cdot \bar{B}) + (B\bar{C} + \bar{A}\bar{C})$   
 C.  $(\bar{A} + \bar{B}) \cdot (B + \bar{C}) + (A + \bar{C})$   
 D.  $(A + B) \cdot (\bar{B} + C)(A + C)$

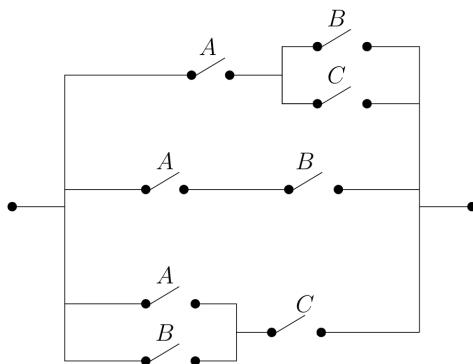
isro2015 digital-logic boolean-algebra

**Answer key**

### 6.5.10 Boolean Algebra: ISRO2016-8 top



The minimum Boolean expression for the following circuit is



- A.  $AB + AC + BC$       B.  $A + BC$       C.  $A + B$       D.  $A + B + C$

isro2016 digital-logic boolean-algebra

**Answer key**

### 6.5.11 Boolean Algebra: ISRO2018-62 top



Any set of Boolean operation that is sufficient to represent all Boolean expression is said to be complete. Which of the following is not complete ?

- A. {AND, OR}    B. {AND, NOT}    C. {NOT, OR}    D. {NOR}

isro2018 digital-logic boolean-algebra

**Answer key**

**6.6**

## Booths Algorithm (1) top



### 6.6.1 Booths Algorithm: ISRO2009-40 , GATE2008-IT\_42 top

The two numbers given below are multiplied using the Booth's algorithm

Multiplicand: 0101 1010 1110 1110

Multiplier: 0111 0111 1011 1101

How many additions/subtractions are required for the multiplication of the above two numbers?

- A. 6      B. 8      C. 10      D. 12

isro2009 digital-logic booths-algorithm

**Answer key**

**6.7**

## Canonical Normal Form (1) top



### 6.7.1 Canonical Normal Form: ISRO2016-16 top

The simplified SOP (Sum of Product) from the Boolean expression

$$(P + \bar{Q} + \bar{R}) \cdot (P + Q + R) \cdot (P + Q + \bar{R})$$

is

- A.  $(\bar{P}, Q + \bar{R})$       B.  $(P + Q, \bar{R})$       C.  $(P, \bar{Q} + R)$       D.  $(P, Q + R)$

digital-logic canonical-normal-form isro2016

[Answer key](#)

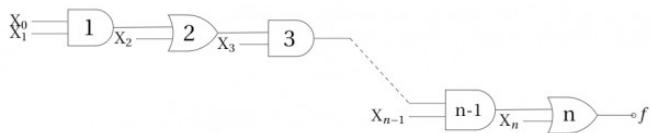
## 6.8

## Circuit Output (9) [top](#)

### 6.8.1 Circuit Output: ISRO2008-12 [top](#)



In the given network of AND and OR gates  $f$  can be written as



- A.  $X_0X_1X_2\dots X_n + X_1X_2\dots X_n + X_2X_3\dots X_n + \dots + X_n$   
 B.  $X_0X_1 + X_2X_3 + \dots + X_{n-1}X_n$   
 C.  $X_0 + X_1 + X_2 + \dots + X_n$   
 D.  $X_0X_1 + X_3\dots X_{n-1} + X_2X_3 + X_5\dots X_{n-1} + \dots + X_{n-2}X_{n-1} + X_n$

isro2008 digital-logic circuit-output

[Answer key](#)

### 6.8.2 Circuit Output: ISRO2008-26 [top](#)



The logic operations of two combinational circuits in Figure-I and Figure-II are

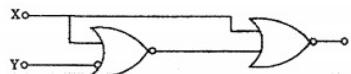


Figure -I

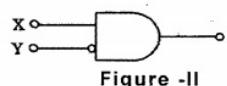


Figure -II

- A. entirely different B. identical C. complementary D. dual

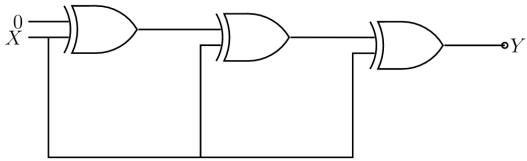
isro2008 digital-logic circuit-output

[Answer key](#)

### 6.8.3 Circuit Output: ISRO2008-27 [top](#)



The output  $Y$  of the given circuit



- A. 1      B. 0      C.  $X$       D.  $X'$

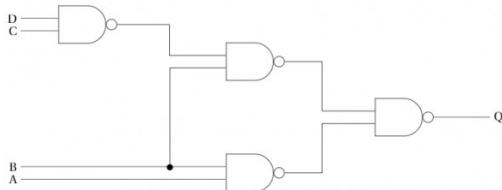
isro2008 digital-logic circuit-output isro-question-fixed

[Answer key](#)



#### 6.8.4 Circuit Output: ISRO2014-15 top

Consider the logic circuit given below:



$Q = \underline{\hspace{2cm}}$  ?

- A.  $\bar{A}C + B\bar{C} + CD$   
 B.  $ABC + \bar{C}D$   
 C.  $AB + B\bar{C} + B\bar{D}$   
 D.  $A\bar{B} + A\bar{C} + \bar{C}D$

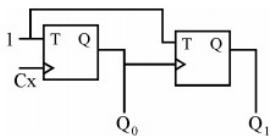
isro2014 digital-logic circuit-output

[Answer key](#)



#### 6.8.5 Circuit Output: ISRO2014-21, UGCNET-Dec2012-III: 23, UGCNET-Dec2013-III: 22 top

What are the final values of  $Q_1$  and  $Q_0$  after 4 clock cycles, if initial values are 00 in the sequential circuit shown below:



- A. 11      B. 01      C. 10      D. 00

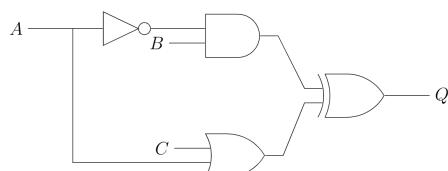
isro2014 digital-logic circuit-output ugcnetcse-dec2012-paper3 ugcnetcse-dec2013-paper3

[Answer key](#)



#### 6.8.6 Circuit Output: ISRO2014-53 top

Consider the logic circuit given below.



The inverter, AND and OR gates have delays of 6, 10 and 11 nanoseconds respectively. Assuming that wire delays are negligible, what is the duration of glitch for Q before it

becomes stable?

- A. 5      B. 11      C. 16      D. 27

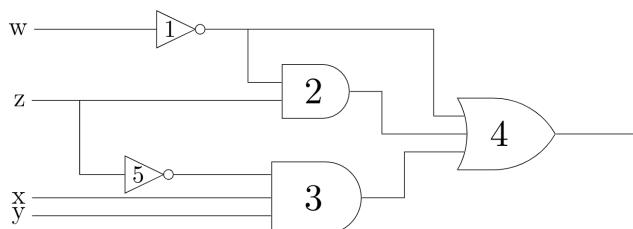
isro2014 digital-logic circuit-output

Answer key 

### 6.8.7 Circuit Output: ISRO2016-10



Consider the following gate network



Which one of the following gates is redundant?

- A. Gate No. 1      B. Gate No. 2      C. Gate No. 3      D. Gate No. 4

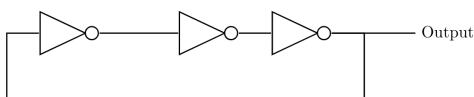
isro2016 digital-logic circuit-output

Answer key 

### 6.8.8 Circuit Output: ISRO2016-13



The circuit given in the figure below is

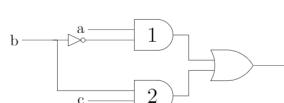


- A. An oscillating circuit and its output is square wave  
B. The one whose output remains stable in '1' state  
C. The one having output remains stable in '0' state  
D. has a single pulse of three times propagation delay

isro2016 digital-logic circuit-output

Answer key 

### 6.8.9 Circuit Output: ISRO2018-9



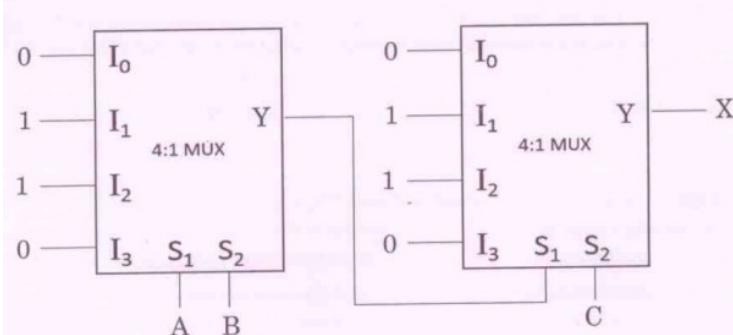
In the diagram above, the inverter (NOT gate) and the AND-gates labeled 1 and 2 have delays of 9, 10 and 12 nanoseconds (ns), respectively. Wire delays are negligible. For certain values  $a$  and  $c$ , together with certain transition of  $b$ , a glitch (spurious output) is generated for a short time, after which the output assumes its correct value. The duration of glitch is:

- a. 7 ns      b. 9 ns      c. 11 ns      d. 13 ns

**Answer key****6.9****Co And Architecture (1)****6.9.1 Co And Architecture: ISRO2012-ECE Computer Architecture**

"Cycle Stealing" in microprocessor parlance refers to

- Special type of DMA access by an external device
- RESET operation at power ON by microprocessor
- Interrupt Acknowledge cycle
- none of above.

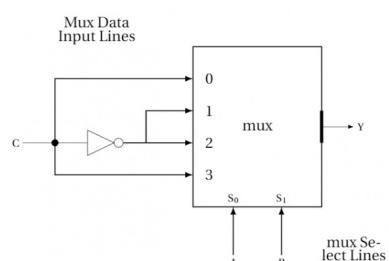
**6.10****Combinational Circuit (6)****6.10.1 Combinational Circuit: ISRO2016-EC combinational logic**

in given combinational logic  $X = ?$

- $X = AB'C' + A'BC' + A'B'C + ABC$
- $X = A'BC + A'BC' + AB'C + A'B'C'$
- $X = AB + BC + AC$
- $X = A'B' + B'C' + A'C'$

**Answer key****6.10.2 Combinational Circuit: ISRO2020-10**

Following Multiplexer circuit is equivalent to



- A. Sum equation of full adder  
 C. Borrow equation for full subtractor  
 B. Carry equation of full adder  
 D. Difference equation of a full subtractor

isro-2020 digital-logic combinational-circuit normal

[Answer key](#)

### 6.10.3 Combinational Circuit: ISRO2020-11 [top](#)



Minimum number of NAND gates required to implement the following binary equation

$$Y = (\overline{A} + \overline{B})(C + D)$$

- A. 4      B. 5      C. 3      D. 6

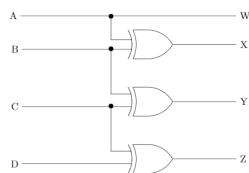
isro-2020 digital-logic combinational-circuit normal

[Answer key](#)

### 6.10.4 Combinational Circuit: ISRO2020-12 [top](#)



If  $ABCD$  is a 4-bit binary number, then what is the code generated by the following circuit?



- A. BCD code      B. Gray code      C. 8421 code      D. Excess-3 code

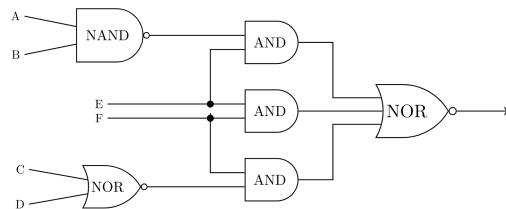
isro-2020 digital-logic combinational-circuit normal

[Answer key](#)

### 6.10.5 Combinational Circuit: ISRO2020-77 [top](#)



Consider the following circuit



The function by the network above is

- A.  $\overline{ABE} + EF + \overline{CDF}$   
 B.  $(\overline{E} + AB\overline{F})(C + D + \overline{F})$   
 C.  $(\overline{AB} + E)(\overline{E} + \overline{F})(C + D + \overline{F})$   
 D.  $(A + B)\overline{E} + \overline{EF} + CDF$

isro-2020 digital-logic combinational-circuit normal

**Answer key**

### 6.10.6 Combinational Circuit: ISRO2020-9 [top](#)



In a 8-bit ripple carry adder using identical full adders, each full adder takes 34 ns for computing sum. If the time taken for 8-bit addition is 90 ns, find time taken by each full adder to find carry.

- A. 6 ns      B. 7 ns      C. 10 ns      D. 8 ns

isro-2020 digital-logic combinational-circuit normal

**Answer key**

### 6.11

### Decoder (1) [top](#)



#### 6.11.1 Decoder: GATE CSE 2007 | Question: 8, ISRO2011-31 [top](#)

How many 3-to-8 line decoders with an enable input are needed to construct a 6-to-64 line decoder without using any other logic gates?

- A. 7      B. 8      C. 9      D. 10

gatecse-2007 digital-logic normal isro2011 decoder

**Answer key**

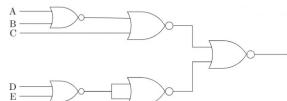
### 6.12

### Digital Circuits (4) [top](#)



#### 6.12.1 Digital Circuits: ISRO2007-02 [top](#)

The circuit shown in the following figure realizes the function.



- A.  $(\overline{A+B} + C)(\bar{D}\bar{E})$   
 C.  $(A + \overline{B+C})(\bar{D}E)$
- B.  $(\overline{A+B} + C)(D\bar{E})$   
 D.  $(A + B + \bar{C})(\bar{D}\bar{E})$

isro2007 digital-logic digital-circuits

**Answer key**



#### 6.12.2 Digital Circuits: ISRO2016-11 [top](#)

The dynamic hazard problem occurs in

- A. combinational circuit alone  
 C. Both (a) and (b)
- B. sequential circuit only  
 D. None of the above

isro2016 digital-logic digital-circuits

**Answer key**



#### 6.12.3 Digital Circuits: ISRO2017-26 [top](#)

Advantage of synchronous sequential circuits over asynchronous one is :

- A. Lower hardware requirement
- B. Better noise immunity
- C. Faster operation
- D. All of the above

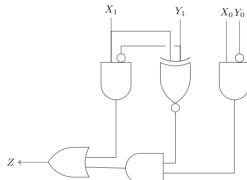
isro2017 digital-logic digital-circuits bad-question

[Answer key](#)



#### 6.12.4 Digital Circuits: ISRO2020-66 [top](#)

The following circuit compares two 2-bit binary numbers,  $X$  and  $Y$  represented by  $X_1 X_0$  and  $Y_1 Y_0$  respectively. ( $X_0$  and  $Y_0$  represent Least Significant Bits)



Under what conditions  $Z$  will be 1?

- A.  $X > Y$
- B.  $X < Y$
- C.  $X = Y$
- D.  $X \neq Y$

isro-2020 digital-logic digital-circuits normal

[Answer key](#)

#### 6.13

#### Digital Counter (2) [top](#)



#### 6.13.1 Digital Counter: ISRO2007-34 [top](#)

Ring counter is analogous to

- A. Toggle Switch
- B. Latch
- C. Stepping Switch
- D. S-R flip flop

isro2007 digital-logic digital-counter

[Answer key](#)



#### 6.13.2 Digital Counter: ISRO2015-4 [top](#)



A modulus -12 ring counter requires a minimum of

- A. 10 flip-flops
- B. 12 flip-flops
- C. 8 flip-flops
- D. 6 flip-flops

isro2015 digital-logic digital-counter

[Answer key](#)

#### 6.14

#### Excess 3 (1) [top](#)



#### 6.14.1 Excess 3: ISRO2007-04 [top](#)

When two numbers are added in excess-3 code and the sum is less than 9, then in order to get the correct answer it is necessary to

- A. subtract 0011 from the sum
- B. add 0011 to the sum
- C. subtract 0110 from the sum
- D. add 0110 to the sum

isro2007 digital-logic number-representation excess-3

[Answer key](#)

6.15

## Flip Flop (4) [top](#)

### 6.15.1 Flip Flop: GATE CSE 2004 | Question: 18, ISRO2007-31 [top](#)



In an *SR* latch made by cross-coupling two NAND gates, if both *S* and *R* inputs are set to 0, then it will result in

- A.  $Q = 0, Q' = 1$
- B.  $Q = 1, Q' = 0$
- C.  $Q = 1, Q' = 1$
- D. Indeterminate states

gatecse-2004 digital-logic easy isro2007 flip-flop

[Answer key](#)

### 6.15.2 Flip Flop: ISRO2007-05 [top](#)



The characteristic equation of an *SR* flip-flop is given by :

- A.  $Q_{n+1} = S + RQ_n$
- B.  $Q_{n+1} = R\bar{Q}_n + \bar{S}Q_n$
- C.  $Q_{n+1} = \bar{S} + RQ_n$
- D.  $Q_{n+1} = S + \bar{R}Q_n$

isro2007 digital-logic flip-flop

[Answer key](#)

### 6.15.3 Flip Flop: ISRO2011-74 [top](#)



In an *RS* flip-flop, if the *S* line (Set line) is set high (1) and the *R* line (Reset line) is set low (0), then the state of the flip-flop is :

- A. Set to 1
- B. Set to 0
- C. No change in state
- D. Forbidden

isro2011 digital-logic flip-flop

[Answer key](#)

### 6.15.4 Flip Flop: ISRO2016-18 [top](#)



The functional difference between *SR* flip-flop and *J-K* flip-flop is that :

- A. *J-K* flip-flop is faster than *SR* flip-flop
- B. *J-K* flip-flop has a feedback path
- C. *J-K* flip-flop accepts both inputs 1
- D. None of them

digital-logic flip-flop isro2016

[Answer key](#)

6.16

## Floating Point Representation (2) [top](#)

### 6.16.1 Floating Point Representation: ISRO2007-36 [top](#)



Consider a computer system that stores a floating-point numbers with 16-bit mantissa and an 8-bit exponent, each in two's complement. The smallest and largest positive values which can be stored are :

- A.  $1 \times 10^{-128}$  and  $2^{15} \times 10^{128}$
- B.  $1 \times 10^{-256}$  and  $2^{15} \times 10^{255}$

- C.  $1 \times 10^{-128}$  and  $2^{15} \times 10^{127}$       D.  $1 \times 10^{-128}$  and  $2^{15} - 1 \times 10^{127}$

isro2007 digital-logic number-representation floating-point-representation

Answer key 

### 6.16.2 Floating Point Representation: ISRO2008-23 [top](#)

A computer uses 8 digit mantissa and 2 digit exponent. If  $a = 0.052$  and  $b = 28E+11$  then  $b + a - b$  will :

- A. result in an overflow error      B. result in an underflow error  
C. be 0      D. be  $5.28E+11$

isro2008 digital-logic number-representation floating-point-representation

Answer key 

## 6.17

### Ieee Representation (3) [top](#)

#### 6.17.1 Ieee Representation: ISRO2011-8 [top](#)

What is the decimal value of the floating-point number  $C1D00000$  (hexadecimal notation)? (Assume 32-bit, single precision floating point IEEE representation)

- A. 28      B. -15      C. -26      D. -28

isro2011 digital-logic number-representation floating-point-representation ieee-representation

Answer key 

#### 6.17.2 Ieee Representation: ISRO2014-8 [top](#)

In the standard IEEE 754 single precision floating point representation, there is 1 bit for sign, 23 bits for fraction and 8 bits for exponent. What is the precision in terms of the number of decimal digits?

- A. 5  
B. 6  
C. 7  
D. 8

number-representation ieee-representation isro2014

Answer key 

#### 6.17.3 Ieee Representation: ISRO2015-1 [top](#)

Which of the given number has its IEEE - 754 32-bit floating point representation as (0 10000000 110 0000 0000 0000 0000 0000)

- A. 2.5      B. 3.0      C. 3.5      D. 4.5

isro2015 digital-logic number-representation floating-point-representation ieee-representation

Answer key 

## 6.18

### K Map (1) [top](#)

### 6.18.1 K Map: ISRO2009-20 [top](#)



Consider the following boolean function of four variables  $f(w, x, y, z) = \Sigma(1, 3, 4, 6, 911, 12, 14)$ , the function is

- A. Independent of one variable
- B. Independent of two variables
- C. Independent of three variables
- D. Dependent on all variables

isro2009 digital-logic k-map

[Answer key](#)

### 6.19

### Memory Interfacing (2) [top](#)



#### 6.19.1 Memory Interfacing: GATE CSE 2009 | Question: 7, ISRO2015-3 [top](#)

How many  $32K \times 1$  RAM chips are needed to provide a memory capacity of  $256K$ -bytes?

- A. 8
- B. 32
- C. 64
- D. 128

gatecse-2009 digital-logic memory-interfacing easy out-of-syllabus-now isro2015

[Answer key](#)

#### 6.19.2 Memory Interfacing: ISRO2014-25 [top](#)



Suppose you want to build a memory with 4 byte words and a capacity of  $2^{21}$  bits. What is type of decoder required if the memory is built using  $2K \times 8$  RAM chips?

- A. 5 to 32
- B. 6 to 64
- C. 4 to 16
- D. 7 to 128

digital-logic memory-interfacing isro2014

[Answer key](#)

### 6.20

### Min No Gates (2) [top](#)



#### 6.20.1 Min No Gates: ISRO2016-7 [top](#)

The minimum number of NAND gates required to implement the Boolean function  $A + A\bar{B} + A\bar{B}C$  is equal to

- A. 0 (Zero)
- B. 1
- C. 4
- D. 7

digital-logic min-no-gates isro2016

[Answer key](#)

#### 6.20.2 Min No Gates: ISRO2017-23 [top](#)



What is the minimum number of two-input NAND gates used to perform the function of two-input OR gate?

- A. One
- B. Two
- C. Three
- D. Four

isro2017 digital-logic min-no-gates

[Answer key](#)

6.21

Multiplexer (2) [top](#)



### 6.21.1 Multiplexer: ISRO2008-22 [top](#)

How many 2-input multiplexers are required to construct a  $2^{10}$ -input multiplexer?

- A. 1023      B. 31      C. 10      D. 127

isro2008 digital-logic multiplexer

[Answer key](#)



### 6.21.2 Multiplexer: ISRO2015-8 [top](#)

Minimum number of  $2 \times 1$  multiplexers required to realize the following function,  
 $f = \bar{A}\bar{B}C + \bar{A}\bar{B}\bar{C}$

Assume that inputs are available only in true form and Boolean a constant 1 and 0 are available.

- A. 1      B. 2      C. 3      D. 7

isro2015 digital-logic multiplexer

[Answer key](#)

6.22

Number Representation (15) [top](#)



### 6.22.1 Number Representation: GATE CSE 1995 | Question: 2.12, ISRO2015-9 [top](#)

The number of 1's in the binary representation of  $(3 * 4096 + 15 * 256 + 5 * 16 + 3)$  are:

- A. 8      B. 9      C. 10      D. 12

gate1995 digital-logic number-representation normal isro2015

[Answer key](#)



### 6.22.2 Number Representation: GATE CSE 2005 | Question: 16, ISRO2009-18, ISRO2015-2 [top](#)

The range of integers that can be represented by an  $n$  bit  $2^{'s}$  complement number system is:

- A.  $-2^{n-1}$  to  $(2^{n-1} - 1)$       B.  $-(2^{n-1} - 1)$  to  $(2^{n-1} - 1)$   
 C.  $-2^{n-1}$  to  $2^{n-1}$       D.  $-(2^{n-1} + 1)$  to  $(2^{n-1} - 1)$

gatecse-2005 digital-logic number-representation easy isro2009 isro2015

[Answer key](#)



### 6.22.3 Number Representation: GATE CSE 2009 | Question: 5, ISRO2017-57 [top](#)

$(1217)_8$  is equivalent to

- A.  $(1217)_{16}$       B.  $(028F)_{16}$       C.  $(2297)_{10}$       D.  $(0B17)_{16}$

gatecse-2009 digital-logic number-representation isro2017

Answer key 

#### 6.22.4 Number Representation: GATE IT 2006 | Question: 7, ISRO2009-41 [top](#)

The addition of 4 – bit, two's complement, binary numbers 1101 and 0100 results in

- A. 0001 and an overflow      B. 1001 and no overflow  
C. 0001 and no overflow      D. 1001 and an overflow

gateit-2006 digital-logic number-representation normal isro2009

Answer key 

#### 6.22.5 Number Representation: ISRO2007-18 [top](#)

The number of digit 1 present in the binary representation of  $3 \times 512 + 7 \times 64 + 5 \times 8 + 3$  is

- A. 8      B. 9      C. 10      D. 12

isro2007 digital-logic number-representation

Answer key 

#### 6.22.6 Number Representation: ISRO2007-30 [top](#)

0.75 decimal system is equivalent to \_\_\_\_\_ in octal system

- A. 0.60  
B. 0.52  
C. 0.54  
D. 0.50

isro2007 digital-logic number-representation

Answer key 

#### 6.22.7 Number Representation: ISRO2007-38 [top](#)

The Hexadecimal equivalent of 01111100110111100011 is

- A. CD73E      B. ABD3F      C. 7CDE3      D. FA4CD

isro2007 digital-logic number-representation

Answer key 

#### 6.22.8 Number Representation: ISRO2008-13 [top](#)

If  $N^2 = (7601)_8$  where  $N$  is a positive integer, then the value of  $N$  is

- A.  $(241)_5$       B.  $(143)_6$       C.  $(165)_7$       D.  $(39)_{16}$

isro2008 digital-logic number-representation

**Answer key** 

### 6.22.9 Number Representation: ISRO2008-20 top

If  $(12x)_3 = (123)_x$ , then the value of  $x$  is

- A. 3
- B. 3 or 4
- C. 2
- D. None of these

isro2008 digital-logic number-representation

**Answer key** 

### 6.22.10 Number Representation: ISRO2009-39 , GATE2008-IT\_15 top

A processor that has carry, overflow and sign flag bits as part of its program status word (PSW) performs addition of the following two 2's complement numbers 01001101 and 11101001. After the execution of this addition operation, the status of the carry, overflow and sign flags, respectively will be

- A. 1, 1, 0
- B. 1, 0, 0
- C. 0, 1, 0
- D. 1, 0, 1

isro2009 number-representation digital-logic

**Answer key** 

### 6.22.11 Number Representation: ISRO2015-78 top

The decimal number has 64 digits. The number of bits needed for its equivalent binary representation is?

- A. 200
- B. 213
- C. 246
- D. 277

isro2015 digital-logic number-representation

**Answer key** 

### 6.22.12 Number Representation: ISRO2016-14 top

If  $12A7C_{16} = X_8$  then the value of  $X$  is

- A. 224174
- B. 425174
- C. 6173
- D. 225174

digital-logic number-representation isro2016

**Answer key** 

### 6.22.13 Number Representation: ISRO2016-17 top

Which of the following binary number is the same as its 2's complement ?

- A. 1010
- B. 0101
- C. 1000
- D. 1001

digital-logic number-representation isro2016

**Answer key** 

### 6.22.14 Number Representation: ISRO2018-19 top

Given  $\sqrt{224}_r = 13_r$  the value of radix  $r$  is

a. 10

b. 8

c. 6

d. 5

isro2018 number-representation digital-logic

Answer key 

### 6.22.15 Number Representation: ISRO2018-3 [top](#)

If a variable can take only integral values from 0 to  $n$ , where  $n$  is an integer, then the variable can be represented as a bit-field whose width is (the log in the answer are to the base 2, and  $\lceil \log n \rceil$  means the floor of  $\log n$ )

- a.  $\lceil \log(n) \rceil + 1$  bits
- b.  $\lceil \log(n - 1) \rceil + 1$  bits
- c.  $\lceil \log(n + 1) \rceil + 1$  bits
- d. None of the above

isro2018 number-representation digital-logic

Answer key 

## 6.23

### Sequential Circuit (1) [top](#)

#### 6.23.1 Sequential Circuit: ISRO2020-80 [top](#)

A new flipflop with inputs  $X$  and  $Y$ , has the following property

X	Y	Current state	Next state
0	0	$Q$	1
0	1	$Q$	$\bar{Q}$
1	1	$Q$	0
1	0	$Q$	$Q$

Which of the following expresses the next state in terms of  $X, Y$ , current state?

- A.  $(\bar{X} \wedge \bar{Q}) \vee (\bar{Y} \wedge Q)$
- B.  $(\bar{X} \wedge Q) \vee (\bar{Y} \wedge \bar{Q})$
- C.  $(X \wedge \bar{Q}) \vee (Y \wedge Q)$
- D.  $(X \wedge \bar{Q}) \vee (\bar{Y} \wedge Q)$

isro-2020 digital-logic sequential-circuit flip-flop normal

Answer key 

## 6.24

### Tri State (1) [top](#)

#### 6.24.1 Tri State: ISRO2014-26 [top](#)

The output of a tristate buffer when the enable input is 0 is

- A. Always 0  
 C. Retains the last value when enable input was high  
 B. Always 1  
 D. Disconnected state

isro2014 digital-logic tri-state

[Answer key](#)

## Answer Keys

6.0.1	Q-Q	6.0.2	A	6.0.3	C	6.0.4	B	6.0.5	B
6.0.6	Q-Q	6.0.7	A	6.0.8	Q-Q	6.0.9	Q-Q	6.0.10	Q-Q
6.0.11	A	6.0.12	Q-Q	6.0.13	Q-Q	6.0.14	Q-Q	6.0.15	Q-Q
6.0.16	Q-Q	6.0.17	Q-Q	6.0.18	Q-Q	6.0.19	Q-Q	6.0.20	C
6.0.21	Q-Q	6.1.1	B	6.1.2	C	6.1.3	D	6.2.1	D
6.3.1	B	6.3.2	X	6.3.3	C	6.4.1	C	6.5.1	C
6.5.2	A	6.5.3	A	6.5.4	X	6.5.5	B	6.5.6	Q-Q
6.5.7	C	6.5.8	B	6.5.9	A	6.5.10	A	6.5.11	A
6.6.1	B	6.7.1	B	6.8.1	X	6.8.2	A	6.8.3	C
6.8.4	C	6.8.5	D	6.8.6	A	6.8.7	B	6.8.8	A
6.8.9	A	6.9.1	Q-Q	6.10.1	Q-Q	6.10.2	A;D	6.10.3	A
6.10.4	B	6.10.5	B	6.10.6	D	6.11.1	C	6.12.1	A
6.12.2	C	6.12.3	X	6.12.4	A	6.13.1	C	6.13.2	B
6.14.1	A	6.15.1	C	6.15.2	D	6.15.3	A	6.15.4	C
6.16.1	D	6.16.2	C	6.17.1	C	6.17.2	C	6.17.3	C
6.18.1	B	6.19.1	C	6.19.2	A	6.20.1	A	6.20.2	C
6.21.1	A	6.21.2	B	6.22.1	C	6.22.2	A	6.22.3	B
6.22.4	C	6.22.5	B	6.22.6	A	6.22.7	C	6.22.8	B
6.22.9	D	6.22.10	B	6.22.11	B	6.22.12	D	6.22.13	C
6.22.14	D	6.22.15	A	6.23.1	A	6.24.1	D		


**7.0.1 ISRO2014-73** top ↗


How many different trees are there with four nodes  $A, B, C$  and  $D$ ?

- A. 30      B. 60      C. 90      D. 120

combinatory isro2014

[Answer key ↗](#)

**7.1**
**Binary Search Tree (1)** top ↗

**7.1.1 Binary Search Tree: ISRO2011-11** top ↗

How many distinct binary search trees can be created out of 4 distinct keys?

- A. 5      B. 14      C. 24      D. 35

isro2011 combinatory binary-search-tree

[Answer key ↗](#)

**7.2**
**Recurrence Relation (1)** top ↗

**7.2.1 Recurrence Relation: ISRO2014-19** top ↗

The number of bit strings of length 8 that will either start with 1 or end with 00 is?

- A. 32  
B. 128  
C. 160  
D. 192

isro2014 combinatory recurrence-relation

[Answer key ↗](#)

## Answer Keys

7.0.1

Q-Q

7.1.1

B

7.2.1

C


**8.0.1 ISRO2011-35** top ↗


How many edges are there in a forest with  $v$  vertices and  $k$  components?

- A.  $(v + 1) - k$     B.  $(v + 1)/2 - k$     C.  $v - k$     D.  $v + k$

isro2011 graph-theory

**Answer key** ↗

**8.0.2 ISRO2007-06** top ↗


A graph with  $n$  vertices and  $n - 1$  edges that is not a tree, is

- A. Connected    B. Disconnected    C. Euler    D. A circuit

isro2007 graph-theory

**Answer key** ↗

**8.0.3 ISRO2007-62** top ↗


Let  $X$  be the adjacency matrix of a graph  $G$  with no self loops. The entries along the principal diagonal of  $X$  are

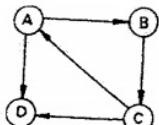
- A. all zeros    B. all ones    C. both zeros and ones    D. different

isro2007 graph-theory

**Answer key** ↗

**8.0.4 ISRO2008-78** top ↗


Consider the graph shown in the figure below:



Which of the following is a valid strong component?

- A. a, c, d    B. a, b, d    C. b, c, d    D. a, b, c

isro2008 graph-theory

**Answer key** ↗

**8.0.5 ISRO2009-52** top ↗


If  $G$  is a graph with  $e$  edges and  $n$  vertices the sum of the degrees of all vertices in  $G$  is

- A.  $e$     B.  $e/2$     C.  $e^2$     D.  $2e$

**Answer key****8.0.6 ISRO2009-54** top

A graph in which all nodes are of equal degree, is known as

- A. Multigraph
- B. Non regular graph
- C. Regular graph
- D. Complete graph

**Answer key****8.0.7 ISRO2009-55** top

In a graph  $G$  there is one and only one path between every pair of vertices then  $G$  is a

- A. Path
- B. Walk
- C. Tree
- D. Circuit

**Answer key****8.0.8 ISRO2009-56** top

A simple graph ( a graph without parallel edge or loops) with  $n$  vertices and  $k$  components can have at most

- A.  $n$  edges
- B.  $n - k$  edges
- C.  $(n - k)(n - k + 1)$  edges
- D.  $(n - k)(n - k + 1)/2$  edges

**Answer key****8.1****Counting (1)** top**8.1.1 Counting: GATE CSE 1994 | Question: 1.6, ISRO2008-29** top

The number of distinct simple graphs with up to three nodes is

- A. 15
- B. 10
- C. 7
- D. 9

**Answer key****8.2****Euler Graph (1)** top**8.2.1 Euler Graph: ISRO2016-5** top

A given connected graph  $G$  is a Euler Graph if and only if all vertices of  $G$  are of

- A. same degree
- B. even degree
- C. odd degree
- D. different degree

[Answer key](#)**8.3****Graph Coloring (1)** [top](#)**8.3.1 Graph Coloring: ISRO2007-07** [top](#)

If a graph requires  $k$  different colours for its proper colouring, then the chromatic number of the graph is

- A. 1
- B.  $k$
- C.  $k-1$
- D.  $k/2$

[Answer key](#)**8.4****Graph Connectivity (3)** [top](#)**8.4.1 Graph Connectivity: GATE CSE 2002 | Question: 1.25, ISRO2008-30, ISRO2016-6**[top](#)

The maximum number of edges in a  $n$ -node undirected graph without self loops is

- A.  $n^2$
- B.  $\frac{n(n-1)}{2}$
- C.  $n - 1$
- D.  $\frac{(n+1)(n)}{2}$

[Answer key](#)**8.4.2 Graph Connectivity: GATE CSE 2003 | Question: 8, ISRO2009-53** [top](#)

Let  $G$  be an arbitrary graph with  $n$  nodes and  $k$  components. If a vertex is removed from  $G$ , the number of components in the resultant graph must necessarily lie down between

- A.  $k$  and  $n$
- B.  $k - 1$  and  $k + 1$
- C.  $k - 1$  and  $n - 1$
- D.  $k + 1$  and  $n - k$

[Answer key](#)**8.4.3 Graph Connectivity: ISRO2018-38** [top](#)

The number of edges in a regular graph of degree:  $d$  and  $n$  vertices is:

- a. maximum of  $n$  and  $d + d$
- c.  $nd$
- d.  $nd/2$

[Answer key](#)**8.5****Group Theory (1)** [top](#)**8.5.1 Group Theory: ISRO2016-4** [top](#)

If  $(G, \cdot)$  is a group such that  $(ab)^{-1} = a^{-1}b^{-1}, \forall a, b \in G$ , then  $G$  is a/an

- A. Commutative semi group
- C. Non-abelian group

- B. Abelian group
- D. None of these

set-theory&algebra    group-theory    isro2016

Answer key 

## Answer Keys

8.0.1	C
8.0.6	C
8.4.1	B

8.0.2	B
8.0.7	C
8.4.2	C

8.0.3	A
8.0.8	D
8.4.3	D

8.0.4	D
8.2.1	B
8.5.1	B

8.0.5	D
8.3.1	B



## 9.1

Boolean Algebra (1) top ↗9.1.1 Boolean Algebra: ISRO2017-22 top ↗

Which one of the following Boolean expressions is NOT a tautology?

- A.  $((a \rightarrow b) \wedge (b \rightarrow c)) \rightarrow (a \rightarrow c)$
- B.  $(a \leftrightarrow c) \rightarrow (\sim b \rightarrow (a \wedge c))$
- C.  $(a \wedge b \wedge c) \rightarrow (c \vee a)$
- D.  $a \rightarrow (b \rightarrow a)$

isro2017 boolean-algebra mathematical-logic

Answer key

## 9.2

First Order Logic (1) top ↗9.2.1 First Order Logic: GATE CSE 2004 | Question: 23, ISRO2007-32 top ↗

Identify the correct translation into logical notation of the following assertion.

Some boys in the class are taller than all the girls

Note:  $\text{taller}(x, y)$  is true if  $x$  is taller than  $y$ .

- A.  $(\exists x)(\text{boy}(x) \rightarrow (\forall y)(\text{girl}(y) \wedge \text{taller}(x, y)))$
- B.  $(\exists x)(\text{boy}(x) \wedge (\forall y)(\text{girl}(y) \wedge \text{taller}(x, y)))$
- C.  $(\exists x)(\text{boy}(x) \rightarrow (\forall y)(\text{girl}(y) \rightarrow \text{taller}(x, y)))$
- D.  $(\exists x)(\text{boy}(x) \wedge (\forall y)(\text{girl}(y) \rightarrow \text{taller}(x, y)))$

gatecse-2004 mathematical-logic easy isro2007 first-order-logic

Answer key

## 9.3

Propositional Logic (1) top ↗9.3.1 Propositional Logic: ISRO2020-73 top ↗

Given that

$B(a)$  means “ $a$  is a bear”

$F(a)$  means “ $a$  is a fish” and

$E(a, b)$  means “ $a$  eats  $b$ ”

Then what is the best meaning of

$$\forall x[F(x) \rightarrow \forall y(E(y, x) \rightarrow b(y))]$$

- A. Every fish is eaten by some bear
- B. Bears eat only fish
- C. Every bear eats fish
- D. Only bears eat fish

Answer key 

## Answer Keys

9.1.1

B

9.2.1

D

9.3.1

D

10

## Discrete Mathematics: Set Theory & Algebra (8)



10.1

### Equivalence Class (1) top ↗



#### 10.1.1 Equivalence Class: ISRO2007-29 top ↗

The set of all Equivalence Classes of a set A of Cardinality C

- A. is of cardinality  $2^C$
- B. have the same cardinality as A
- C. forms a partition of A
- D. is of cardinality  $C^2$

isro2007 set-theory&algebra equivalence-class

[Answer key](#)

10.2

### Functions (2) top ↗



#### 10.2.1 Functions: ISRO2014-50 top ↗

Let  $A$  be a finite set having  $x$  elements and let  $B$  be a finite set having  $y$  elements. What is the number of distinct functions mapping  $B$  into  $A$ .

- A.  $x^y$
- B.  $2^{(x+y)}$
- C.  $y^x$
- D.  $y!/(y-x)!$

isro2014 set-theory&algebra functions combinatory

[Answer key](#)



#### 10.2.2 Functions: ISRO2018-15 top ↗

The domain of the function  $\log(\log \sin(x))$  is:

- a.  $0 < x < \pi$
- b.  $2n\pi < x < (2n+1)\pi$ , for  $n$  in  $N$
- c. Empty set
- d. None of the above

isro2018 functions set-theory&algebra

[Answer key](#)

10.3

### Group Theory (1) top ↗



#### 10.3.1 Group Theory: ISRO2018-17 top ↗

$(G, *)$  is an abelian group. Then

1.  $x = x^{-1}$  for any  $x$  belonging to  $G$
2.  $x = x^2$  for any  $x$  belonging to  $G$
3.  $(x * y)^2 = x^2 * y^2$ , for any  $x, y$  belonging to  $G$
4.  $G$  is of finite order

isro2018 group-theory set-theory&algebra

[Answer key](#)

10.4

### Relations (1) top ↗

#### 10.4.1 Relations: ISRO2018-56 [top](#)



The time complexity of computing the transitive closure of binary relation on a set of  $n$  elements is known to be

- a.  $O(n)$       b.  $O(n * \log(n))$     c.  $O(n^{\frac{3}{2}})$       d.  $O(n^3)$

isro2018 set-theory&algebra relations

[Answer key](#)

#### 10.5

#### Set Theory (3) [top](#)

##### 10.5.1 Set Theory: ISRO2011-27 [top](#)



Which one of the following is true?

- A.  $R \cap S = (R \cup S) - [(R - S) \cup (S - R)]$   
B.  $R \cup S = (R \cap S) - [(R - S) \cup (S - R)]$   
C.  $R \cap S = (R \cup S) - [(R - S) \cap (S - R)]$   
D.  $R \cap S = (R \cup S) \cup (R - S)$

isro2011 set-theory&algebra set-theory

[Answer key](#)

##### 10.5.2 Set Theory: ISRO2017-9 [top](#)



The symmetric difference of sets  $A = \{1, 2, 3, 4, 5, 6, 7, 8\}$  and  $B = \{1, 3, 5, 6, 7, 8, 9\}$  is:

- A.  $\{1, 3, 5, 6, 7, 8\}$       B.  $\{2, 4, 9\}$   
C.  $\{2, 4\}$       D.  $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

isro2017 set-theory&algebra set-theory

[Answer key](#)

##### 10.5.3 Set Theory: ISRO2020-76 [top](#)



If  $A = \{x, y, z\}$  and  $B = \{u, v, w, x\}$ , and the universe is  $\{s, t, u, v, w, x, y, z\}$ . Then  $(A \cup \bar{B}) \cap (A \cap B)$  is equal to

- A.  $\{u, v, w, x\}$       B.  $\{\}$       C.  $\{u, v, w, x, y, z\}$       D.  $\{u, v, w\}$

isro-2020 discrete-mathematics set-theory&algebra set-theory easy

[Answer key](#)

## Answer Keys

10.1.1	C	10.2.1	A	10.2.2	C	10.3.1	C	10.4.1	D
10.5.1	A	10.5.2	B	10.5.3	X				

11.0.1 ISRO2009- 45 [top](#)

Which of the following statement is correct

- A.  $\Delta(U_k V_k) = U_k \Delta V_k + V_k \Delta U_k$
- B.  $\Delta(U_k V_k) = U_{k+1} \Delta V_k + V_{k+1} \Delta U_k$
- C.  $\Delta(U_k V_k) = V_{k+1} \Delta U_k + U_k \Delta V_k$
- D.  $\Delta(U_k V_k) = U_{k+1} \Delta V_k + V_k \Delta U_k$

isro2009 calculus

[Answer key](#)

11.0.2 ISRO2009-49 [top](#)

$x = a \cos(t), y = b \sin(t)$  is the parametric form of

- A. Ellipse
- B. Hyperbola
- C. Circle
- D. Parabola

isro2009 calculus

[Answer key](#)

11.0.3 ISRO2011-59 [top](#)

$n$ -th derivative of  $x^n$  is

- A.  $nx^{n-1}$
- B.  $n^n \cdot n!$
- C.  $nx^n!$
- D.  $n!$

isro2011 calculus

[Answer key](#)

11.0.4 ISRO2016- EC Calculus [top](#)

Evaluate  $\int_0^1 \int_0^{\sqrt{1+x^2}} \frac{dx \cdot dy}{(1+x^2+y^2)}$

- |  |  |
|--|--|
| (a) $\frac{\pi}{2} [\log(1+\sqrt{2})]$ | (b) $\frac{\pi}{4} [\log(1+\sqrt{2})]$ |
| (c) $\frac{\pi}{2} [\log(1-\sqrt{2})]$ | (d) $\frac{\pi}{4} [\log(1-\sqrt{2})]$ |

isro2016-ece isro-ece engineering-mathematics calculus

[Answer key](#)

11.0.5 ISRO2012-ECE Engineering Mathematics [top](#)

If  $x = e^{y+e^{y+e^{y+\dots}}}$

then  $\frac{dy}{dx}$  is

- a)  $1-x$
- b)  $(1-x)/x$
- c)  $1/x$
- d)  $x/(1-x)$

engineering-mathematics isro2012-ece isro-ece calculus

Answer key 

#### 11.0.6 ISRO2012-ECE: Engineering Mathematics [top](#)



The area bounded by the curves  $y^2 = x$ ,  $y = x$  is given by

- a.  $2/3$
- b.  $1/2$
- c.  $1/6$
- d.  $1/3$

isro-ece isro2012-ece engineering-mathematics calculus

Answer key 

#### 11.0.7 ISRO2006-ECE calculus [top](#)



$\int \frac{dx}{x\sqrt{x^2 - a^2}}$  is

- |  |  |
|--|--|
| a) $\frac{1}{a} \cosec^{-1}\left(\frac{x}{a}\right)$ | b) $\frac{1}{a} \sin^{-1}\left(\frac{x}{a}\right)$ |
| c) $\frac{1}{a} \cos^{-1}\left(\frac{x}{a}\right)$   | d) $\frac{1}{a} \sec^{-1}\left(\frac{x}{a}\right)$ |

isro-ece engineering-mathematics calculus

Answer key 

### 11.1

#### Limits (2) [top](#)



##### 11.1.1 Limits: ISRO2016-3 [top](#)

$\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - \sqrt{1-x}}{x}$  is given by

- A. 0
- B. -1
- C. 1
- D.  $\frac{1}{2}$

calculus limits isro2016

[Answer key](#)

### 11.1.2 Limits: ISRO2016-EC Mathematics [top](#)



The value of  $\lim_{x \rightarrow 8} \left( \frac{x^{1/3} - 2}{x - 8} \right)$  is

- a) 1/4
- b) 1/8
- c) 1/12
- d) 1/16

[isro2016-ece](#) [isro-ece](#) [engineering-mathematics](#) [calculus](#) [limits](#)

[Answer key](#)

### 11.2

### Maxima Minima (1) [top](#)



#### 11.2.1 Maxima Minima: ISRO2009-50 [top](#)

The value of  $x$  at which  $y$  is minimum for  $y = x^2 - 3x + 1$  is

- A. -3/2
- B. 3/2
- C. 0
- D. -5/4

[isro2009](#) [calculus](#) [maxima-minima](#)

[Answer key](#)

## Answer Keys

11.0.1	B	11.0.2	A	11.0.3	D	11.0.4	Q-Q	11.0.5	Q-Q
11.0.6	Q-Q	11.0.7	Q-Q	11.1.1	C	11.1.2	Q-Q	11.2.1	B



### 12.0.1 ISRO2012-ECE: Engineering Mathematics top ↗



The system of equations  $x + y + z = 6$ ,  $2x + y + z = 7$ ,  $x + 2y + z = 8$  has

- a. A unique solution
- b. No solution
- c. An infinite number of solutions
- d. None of these

[isro2012-ece](#) [isro-ece](#) [engineering-mathematics](#) [linear-algebra](#)

[Answer key ↗](#)

## 12.1

### Determinant (2) top ↗



#### 12.1.1 Determinant: ISRO2008-31 top ↗

If the two matrices  $\begin{bmatrix} 1 & 0 & x \\ 0 & x & 1 \\ 0 & 1 & x \end{bmatrix}$  and  $\begin{bmatrix} x & 1 & 0 \\ x & 0 & 1 \\ 0 & x & 1 \end{bmatrix}$  have the same determinant, then the value of  $x$  is

- A.  $\frac{1}{2}$
- B.  $\sqrt{2}$
- C.  $\pm\frac{1}{2}$
- D.  $\pm\frac{1}{\sqrt{2}}$

[isro2008](#) [linear-algebra](#) [matrix](#) [determinant](#)

[Answer key ↗](#)



#### 12.1.2 Determinant: ISRO2009-63 top ↗

$$\begin{vmatrix} 265 & 240 & 219 \\ 240 & 225 & 198 \\ 219 & 198 & 181 \end{vmatrix} =$$

- A. 779
- B. 679
- C. 0
- D. 256

[isro2009](#) [linear-algebra](#) [matrix](#) [determinant](#)

[Answer key ↗](#)

## 12.2

### Eigen Value (1) top ↗



#### 12.2.1 Eigen Value: ISRO2007-09 top ↗

Eigen vectors of  $\begin{bmatrix} 1 & \cos \theta \\ \cos \theta & 1 \end{bmatrix}$  are

- A.  $\begin{bmatrix} a^n & 1 \\ 0 & a^n \end{bmatrix}$
- B.  $\begin{bmatrix} a^n & n \\ 0 & a^n \end{bmatrix}$
- C.  $\begin{bmatrix} a^n & na^{n-1} \\ 0 & a^n \end{bmatrix}$
- D.  $\begin{bmatrix} a^n & na^{n-1} \\ -n & a^n \end{bmatrix}$

isro2007 linear-algebra matrix eigen-value

[Answer key](#)

12.3

Matrix (8) [top](#)



12.3.1 Matrix: ISRO2008-34 [top](#)

If a square matrix A satisfies  $A^T A = I$ , then the matrix A is

- A. Idempotent      B. Symmetric      C. Orthogonal      D. Hermitian

isro2008 linear-algebra matrix

[Answer key](#)



12.3.2 Matrix: ISRO2009-59 [top](#)

A square matrix A is called orthogonal if  $A'A=$

- A. I      B. A      C. -A      D. -I

isro2009 linear-algebra matrix

[Answer key](#)



12.3.3 Matrix: ISRO2009-60 [top](#)

If two adjacent rows of a determinant are interchanged, the value of the determinant

- |                       |   |
|-----------------------|---|
| A. becomes zero       | B. remains unaltered                      |
| C. becomes infinitive | D. becomes negative of its original value |

isro2009 linear-algebra matrix

[Answer key](#)



12.3.4 Matrix: ISRO2009-61 [top](#)

If  $\begin{vmatrix} 3 & 3 \\ x & 5 \end{vmatrix} = 3$  then the value of x is

- A. 2      B. 3      C. 4      D. 5

isro2009 linear-algebra matrix

**Answer key**

### 12.3.5 Matrix: ISRO2009-62 top ↗



If A, B, C are any three matrices, then  $A'+B'+C'$  is equal to

- A. a null matrix    B.  $A+B+C$     C.  $(A+B+C)'$     D.  $-(A+B+C)$

isro2009 linear-algebra matrix

**Answer key**

### 12.3.6 Matrix: ISRO2011-36 top ↗



If A and B are square matrices with same order and A is symmetric, then  $B^T AB$  is

- A. Skew symmetric    B. Symmetric    C. Orthogonal    D. Idempotent

isro2011 linear-algebra matrix

**Answer key**

### 12.3.7 Matrix: ISRO2014-72 top ↗



The rank of the matrix  $A = \begin{pmatrix} 1 & 2 & 1 & -1 \\ 9 & 5 & 2 & 2 \\ 7 & 1 & 0 & 4 \end{pmatrix}$  is \_\_\_\_.

- A. 0    B. 1    C. 2    D. 3

matrix linear-algebra isro2014

**Answer key**

### 12.3.8 Matrix: ISRO2017-1 top ↗



If A is a skew symmetric matrix then  $A^t$  is

- A. Diagonal matrix    B. A    C. 0    D.  $-A$

isro2017 linear-algebra matrix

**Answer key**

## Answer Keys

12.0.1	Q-Q
12.3.2	A
12.3.7	C

12.1.1	A
12.3.3	D
12.3.8	D

12.1.2	C
12.3.4	C

12.2.1	Q-Q
12.3.5	C

12.3.1	C
12.3.6	B

13.0.1 GATE CSE 2003 | Question: 60, ISRO2007-45 [top](#)

A program consists of two modules executed sequentially. Let  $f_1(t)$  and  $f_2(t)$  respectively denote the probability density functions of time taken to execute the two modules. The probability density function of the overall time taken to execute the program is given by

- A.  $f_1(t) + f_2(t)$
- B.  $\int_0^t f_1(x)f_2(t-x)dx$
- C.  $\int_0^t f_1(x)f_2(t-x)dx$
- D.  $\max\{f_1(t), f_2(t)\}$

gatecse-2003 probability normal isro2007

[Answer key](#)

13.0.2 ISRO2014-37 [top](#)

The probability that two friends are born in the same month is \_\_\_\_ ?

- A. 1/6
- B. 1/12
- C. 1/144
- D. 1/24

probability isro2014

[Answer key](#)

13.0.3 ISRO2011-61 [top](#)

Three coins are tossed simultaneously. The probability that they will fall two heads and one tail is

- A. 5/8
- B. 1/8
- C. 2/3
- D. 3/8

isro2011 probability

[Answer key](#)

13.0.4 ISRO2016 EC Probability [top](#)

A person on a trip has a choice between a private car and public transport. The probability of using a private car is 0.45. While using public transport, the further choice available are bus and metro. Out of which the probability of commuting by a bus is 0.55. In such a situation, the probability (rounded up to two decimals) of using a car, bus and metro respectively would be

- (a) 0.45, 0.30 and 0.25
- (b) 0.45, 0.25 and 0.30
- (c) 0.45, 0.55 and 0
- (d) 0.45, 0.35 and 0.20

**Answer key****13.0.5 ISRO2012-ECE Probability**

Person X can solve 80% of the ISRO question paper and Person Y can solve 60%. The probability that at least one of them will solve a problem from the question paper, selected at random is :

- a. 0.48
- b. 0.70
- c. 0.88
- d. 0.92

**Answer key****13.0.6 ISRO2018-14**

A class of 30 students occupy a classroom containing 5 rows of seats, with 8 seats in each row. If the students seat themselves at random, the probability that sixth seat in the fifth row will be empty is:

- a. 1/5
- b. 1/3
- c. 1/4
- d. 2/5

**Answer key****13.1****Conditional Probability (2)****13.1.1 Conditional Probability: GATE CSE 1994 | Question: 1.4, ISRO2017-2**

Let  $A$  and  $B$  be any two arbitrary events, then, which one of the following is TRUE?

- |                                 |                                   |
|---------------------------------|-----------------------------------|
| A. $P(A \cap B) = P(A)P(B)$     | B. $P(A \cup B) = P(A) + P(B)$    |
| C. $P(A   B) = P(A \cap B)P(B)$ | D. $P(A \cup B) \leq P(A) + P(B)$ |

**Answer key****13.1.2 Conditional Probability: ISRO2007-33**

Company X shipped 5 computer chips, 1 of which was defective. and company Y shipped 4 computer chips, 2 of which were defective. One computer chip is to be chosen uniformly at a random from the 9 chips shipped by the companies. If the chosen chip is found to be defective, what is the probability that the chip came from the company Y?

- A. 2/9
- B. 4/9
- C. 2/3
- D. 1/2

**Answer key****13.2****Mean Mode Median (1)**

### 13.2.1 Mean Mode Median: ISRO2014-74 [top](#)



What is the median of data if its mode is 15 and the mean is 30?

- A. 30      B. 25      C. 22.5      D. 27.5

probability   statistics   mean-mode-median   isro2014

[Answer key](#)

## 13.3

### Normal Distribution (1) [top](#)



#### 13.3.1 Normal Distribution: ISRO2009-65 [top](#)

If the mean of a normal frequency distribution of 1000 items is 25 and its standard deviation is 2.5, then its maximum ordinate is

- A.  $\frac{1000}{\sqrt{2\pi}} e^{-25}$   
B.  $\frac{1000}{\sqrt{2\pi}}$   
C.  $\frac{1000}{\sqrt{2\pi}} e^{-2.5}$   
D.  $\frac{400}{\sqrt{2\pi}}$

isro2009   statistics   normal-distribution

[Answer key](#)

## 13.4

### Poisson Distribution (1) [top](#)



#### 13.4.1 Poisson Distribution: ISRO2009-66 [top](#)

If the pdf of a Poisson distribution is given by  $f(x) = \frac{e^{-2}2^x}{x!}$  then its mean is

- A.  $2^x$       B. 2      C. -2      D. 1

isro2009   probability   poisson-distribution

[Answer key](#)

## 13.5

### Random Variable (1) [top](#)



#### 13.5.1 Random Variable: GATE CSE 2005 | Question: 12, ISRO2009-64 [top](#)

Let  $f(x)$  be the continuous probability density function of a random variable  $x$ , the probability that  $a < x \leq b$ , is :

- A.  $f(b-a)$   
B.  $f(b) - f(a)$   
C.  $\int_a^b f(x)dx$   
D.  $\int_a^b xf(x)dx$

gatecse-2005   probability   random-variable   easy   isro2009

[Answer key](#)

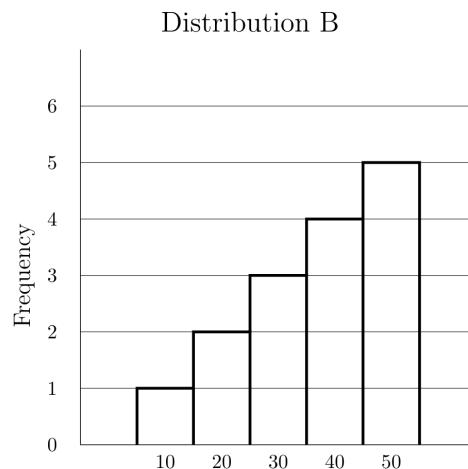
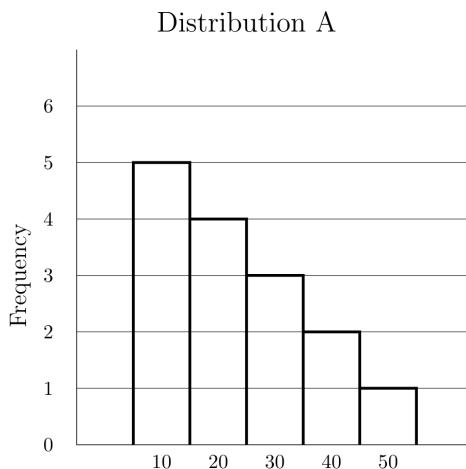
## 13.6

### Standard Deviation (1) [top](#)



#### 13.6.1 Standard Deviation: ISRO2020-56 [top](#)

For the distributions given below:



Which of the following is correct for the above distributions?

- A. Standard deviation of  $A$  is significantly lower than standard deviation of  $B$
- B. Standard deviation of  $A$  is slightly lower than standard deviation of  $B$
- C. Standard deviation of  $A$  is same as standard deviation of  $B$
- D. Standard deviation of  $A$  is significantly higher than standard deviation of  $B$

isro-2020 probability standard-deviation normal

[Answer key](#)

13.7

Statistics (1) [top](#)

#### 13.7.1 Statistics: ISRO2011-67 [top](#)



The arithmetic mean of attendance of 49 students of class A is 40% and that of 53 students of class B is 35%. Then the percentage of arithmetic mean of attendance of class A and B is

- A. 27.2%
- B. 50.25%
- C. 51.13%
- D. 37.4%

isro2011 statistics quantitative-apitude

[Answer key](#)

## Answer Keys

13.0.1	C	13.0.2	B	13.0.3	D	13.0.4	Q-Q	13.0.5	Q-Q
13.0.6	C	13.1.1	D	13.1.2	C	13.2.1	B	13.3.1	D
13.4.1	B	13.5.1	C	13.6.1	C	13.7.1	D		



## 14.1

Quantitative Aptitude (3) top ↗14.1.1 Quantitative Aptitude: ISRO2007-61 top ↗

The Fibonacci sequence is the sequence of integers

- A. 1, 3, 5, 7, 9, 11, 13
- B. 0, 1, 1, 2, 3, 5, 8, 13, 21, 34
- C. 0, 1, 3, 4, 7, 11, 18, 29, 47
- D. 0, 1, 3, 7, 15

isro2007 quantitative-aptitude

**Answer key** ↗

14.1.2 Quantitative Aptitude: ISRO2016-1 top ↗

Which of the following is true ?

- A.  $\sqrt{3} + \sqrt{7} = \sqrt{10}$
- B.  $\sqrt{3} + \sqrt{7} \leq \sqrt{10}$
- C.  $\sqrt{3} + \sqrt{7} < \sqrt{10}$
- D.  $\sqrt{3} + \sqrt{7} > \sqrt{10}$

quantitative-aptitude isro2016

**Answer key** ↗

14.1.3 Quantitative Aptitude: ISRO2020-55 top ↗

If  $x + 2y = 30$ , then  $\left(\frac{2y}{5} + \frac{x}{3}\right) + \left(\frac{x}{5} + \frac{2y}{3}\right)$  will be equal to

- A. 8
- B. 16
- C. 18
- D. 20

isro-2020 quantitative-aptitude easy

**Answer key** ↗

## 14.2

Summation (1) top ↗14.2.1 Summation: ISRO2016-2 top ↗

What is the sum to infinity of the series,

$$3 + 6x^2 + 9x^4 + 12x^6 + \dots \text{ given } |x| < 1$$

- A.  $\frac{3}{(1+x^2)}$
- B.  $\frac{3}{(1+x^2)^2}$
- C.  $\frac{3}{(1-x^2)^2}$
- D.  $\frac{3}{(1-x^2)}$

quantitative-aptitude summation isro2016

**Answer key** ↗

## Answer Keys

14.1.1

B

14.1.2

D

14.1.3

B

14.2.1

C

## 15.1

Neural Network (1) top ↗15.1.1 Neural Network: ISRO2011-2 top ↗

Which of the following is an unsupervised neural network?

- A. RBS
- B. Hopfield
- C. Back propagation
- D. Kohonen

isro2011 neural-network non-gate

Answer key

## Answer Keys

15.1.1

D

## 16.1

Computer Graphics (6) top ↗16.1.1 Computer Graphics: ISRO2008-2 top ↗

The term Phong associated with

- A. Ray tracing
- B. shading
- C. Hiddenline removal game

isro2008 computer-graphics non-gate

**Answer key** ↗

16.1.2 Computer Graphics: ISRO2008-74 top ↗

A Steiner patch is

- |                             |                          |
|-----------------------------|--------------------------|
| A. Biquadratic Bezeir patch | B. Bicubic patch         |
| C. Circular patch only      | D. Bilinear Bezier patch |

isro2008 non-gate computer-graphics

**Answer key** ↗

16.1.3 Computer Graphics: ISRO2011-7 top ↗

Which of the following is true about z-buffer algorithm?

- A. It is a depth sort algorithm
- B. No limitation on total number of objects
- C. Comparisons of objects is done
- D. z-buffer is initialized to background colour at start of algorithm

isro2011 non-gate computer-graphics

**Answer key** ↗

16.1.4 Computer Graphics: ISRO2014-34 top ↗

How much memory is required to implement z-buffer algorithm for a 512 x 512 x 24 bit-plane image?

- A. 768 KB
- B. 1 MB
- C. 1.5 MB
- D. 2 MB

non-gate computer-graphics isro2014

**Answer key** ↗

16.1.5 Computer Graphics: ISRO2014-48 top ↗

A frame buffer array is addressed in row major order for a monitor with pixel locations starting from (0,0) and ending with (100,100). What is address of the pixel(6,10)? Assume one bit storage per pixel and starting pixel location is at 0.

- A. 1016
- B. 1006
- C. 610
- D. 616

Answer key 

16.1.6 Computer Graphics: ISRO2018-39 top



Perform window to viewport transformation for the point (20,15). Assume that  $(X_{wmin}, Y_{wmin})$  is (0,0) ;  $(X_{wmax}, Y_{wmax})$  is (100,100) ;  $(X_{vmin}, Y_{vmin})$  is (5,5) ;  $(X_{vmax}, Y_{vmax})$  is (20,20) . The value of  $x$  and  $y$  in the viewport is

- a.  $x = 4, y = 4$    b.  $x = 3, y = 3$    c.  $x = 8, y = 7.25$  d.  $x = 3, y = 4$

## Answer key

# Answer Keys

16.1.1	B	16.1.2	A	16.1.3	D	16.1.4	Q-Q	16.1.5	A
16.1.6	C								

17.0.1 ISRO2011-9 [top](#)

What is the raw throughput of USB 2.0 technology?

- A. 480 Mbps
- B. 400 Mbps
- C. 200 Mbps
- D. 12 Mbps

isro2011 non-gate

[Answer key](#)

## 17.1

Computer Peripherals (2) [top](#)17.1.1 Computer Peripherals: ISRO2008-44 [top](#)

The device which is used to connect a peripheral to bus is known as

- |                           |                  |
|---------------------------|------------------|
| A. control register       | B. interface     |
| C. communication protocol | D. none of these |

isro2008 non-gate computer-peripherals

[Answer key](#)

17.1.2 Computer Peripherals: ISRO2017-46 [top](#)

SATA is the abbreviation of

- |  |  |
|--|--|
| A. Serial Advanced Technology Attachment | B. Serial Advanced Technology Architecture |
| C. Serial Advanced Technology Adapter    | D. Serial Advanced Technology Array        |

isro2017 computer-peripherals non-gate

[Answer key](#)

## 17.2

Intel8151a (1) [top](#)17.2.1 Intel8151a: ISRO2011-23 [top](#)

What is the meaning of  $\overline{RD}$  signal in Intel 8151A?

- |                           |                                     |
|---------------------------|-------------------------------------|
| A. Read (when it is low)  | B. Read (when it is high)           |
| C. Write (when it is low) | D. Read and Write (when it is high) |

isro2011 non-gate computer-peripherals intel8151a

[Answer key](#)

## 17.3

Video Memory (1) [top](#)17.3.1 Video Memory: ISRO2011-22 [top](#)

A system is having 8 M bytes of video memory for bit-mapped graphics with 64-bit colour. What is the maximum resolution it can support?

- A.  $800 \times 600$
- B.  $1024 \times 768$

C.  $1280 \times 1024$

D.  $1920 \times 1440$

isro2011 video-memory

Answer key 

## Answer Keys

17.0.1

A

17.1.1

B

17.1.2

A

17.2.1

A

17.3.1

B

## 18.1

Digital Image Processing (2) top ↗18.1.1 Digital Image Processing: ISRO2014-7 top ↗

What does a pixel mask mean?

- A. string containing only 1's
- B. string containing only 0's
- C. string containing two 0's
- D. string containing 1's and 0's

non-gate digital-image-processing isro2014

Answer key

18.1.2 Digital Image Processing: ISRO2015-65 top ↗

Which of the following is not an image type used in MPEG?

- A. A frame
- B. B frame
- C. D frame
- D. P frame

isro2015 digital-image-processing non-gate

Answer key

## 18.2

Image Compression (1) top ↗18.2.1 Image Compression: ISRO2015-63 top ↗

Which of the following compression algorithms is used to generate a .png file?

- A. LZ78
- B. Deflate
- C. LZW
- D. Huffman

isro2015 digital-image-processing image-compression non-gate

Answer key

## Answer Keys

18.1.1

D

18.1.2

A

18.2.1

B

## 19.1

Distributed Computing (1) top ↗19.1.1 Distributed Computing: ISRO2014-80 top ↗

A computing architecture, which allows the user to use computers from multiple administrative domains to reach a common goal is called as

- A. Grid Computing
- B. Neural Networks
- C. Parallel Processing
- D. Cluster Computing

isro2014 non-gate distributed-computing

Answer key

## Answer Keys

19.1.1

A

## 20.1

Circle (1) top ↗20.1.1 Circle: ISRO2014-9 top ↗

Let  $R$  be the radius of the circle. What is the angle subtended by an arc of length  $R$  at the center of the circle?

- A. 1 degree
- B. 1 radian
- C. 90 degrees
- D.  $\pi$  radians

isro2014 circle geometry

Answer key

## 20.2

Geometry (3) top ↗20.2.1 Geometry: ISRO2011-76 top ↗

What is the matrix that represents rotation of an object by  $\theta^0$  about the origin in 2D?

- A.  

$$\begin{matrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{matrix}$$
- B.  

$$\begin{matrix} \sin \theta & -\cos \theta \\ \cos \theta & \sin \theta \end{matrix}$$
- C.  

$$\begin{matrix} \cos \theta & -\sin \theta \\ \cos \theta & \sin \theta \end{matrix}$$
- D.  

$$\begin{matrix} \sin \theta & -\cos \theta \\ \cos \theta & \sin \theta \end{matrix}$$

isro2011 geometry

Answer key

20.2.2 Geometry: ISRO2014-54 top ↗

The conic section that is obtained when a right circular cone is cut through a plane that is parallel to the side of the cone is called \_\_\_\_\_

- A. parabola
- B. hyperbola
- C. circle
- D. ellipse

isro2014 non-gate geometry

Answer key

### 20.2.3 Geometry: ISRO2014-65 top



A cube of side 1 unit is placed in such a way that the origin coincides with one of its top vertices and the three axes along three of its edges. What are the co-ordinates of the vertex which is diagonally opposite to the vertex whose co-ordinates are  $(1, 0, 1)$ ?

- A.  $(0, 0, 0)$       B.  $(0, -1, 0)$       C.  $(0, 1, 0)$       D.  $(1, 1, 1)$

isro2014   geometry   non-gate

[Answer key](#)

## Answer Keys

20.1.1

B

20.2.1

A

20.2.2

A

20.2.3

B

## 21.1

Integrated Circuits (4) top ↗21.1.1 Integrated Circuits: ISRO2007-35 top ↗

The output 0 and 1 level for TTL Logic family is approximately

- A. 0.1 and 5V    B. 0.6 and 3.5 V    C. 0.9 and 1.75 V    D. -1.75 and 0.9 V

isro2007 digital-logic integrated-circuits non-gate

[Answer key ↗](#)

21.1.2 Integrated Circuits: ISRO2008-21 top ↗

The advantage of MOS devices over bipolar devices is that

- |   |                            |
|---|----------------------------|
| A. it allows higher bit densities and also cost effective | B. it is easy to fabricate |
| C. it is higher-impedance and operational speed           | D. all of these            |

isro2008 non-gate integrated-circuits

[Answer key ↗](#)

21.1.3 Integrated Circuits: ISRO2011-80 top ↗

Logic family popular for low power dissipation

- A. CMOS    B. ECL    C. TTL    D. DTL

isro2011 non-gate integrated-circuits

[Answer key ↗](#)

21.1.4 Integrated Circuits: ISRO2014-46 top ↗

If the maximum output voltage of a DAC is  $V$  volts and if the resolution is  $R$  bits then the weight of the most significant bit is \_\_\_\_\_

- A.  $V/(2^R - 1)$     B.  $(2^{R-1}).V/(2^R - 1)$     C.  $10^{R-1}.V$     D.  $V/(2^{R-1})$

isro2014 non-gate integrated-circuits

[Answer key ↗](#)

## Answer Keys

21.1.1

B

21.1.2

D

21.1.3

A

21.1.4

B

**22.0.1 ISRO2007-28** [top](#)

The level of aggregation of information required for operational control is

- A. Detailed
- B. Aggregate
- C. Qualitative
- D. None of the above

isro2007 non-gate

[Answer key](#)

**22.1****Cmm Model (1)** [top](#)**22.1.1 Cmm Model: ISRO2017-47** [top](#)

Capability maturity Model (CMM) is the methodology to

- A. develop and refine an organization's software development process
- B. develop the software
- C. test the software
- D. All of the above

isro2017 is&software-engineering non-gate cmm-model

[Answer key](#)

**22.2****Cyclomatic Complexity (4)** [top](#)**22.2.1 Cyclomatic Complexity: GATE CSE 2010 | Question: 21,ISRO2017-60** [top](#)

The cyclomatic complexity of each of the modules A and B shown below is 10. What is the cyclomatic complexity of the sequential integration shown on the right hand side?

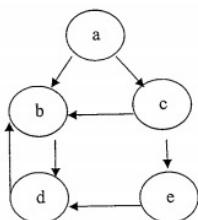
- 
- A. 19
  - B. 21
  - C. 20
  - D. 10

gatecse-2010 is&software-engineering cyclomatic-complexity easy isro2017

[Answer key](#)

**22.2.2 Cyclomatic Complexity: ISRO2011-65** [top](#)

The Cyclomatic Complexity metric  $V(G)$  of the following control flow graph



- A. 3
- B. 4
- C. 5
- D. 6

**Answer key****22.2.3 Cyclomatic Complexity: ISRO2014-4** [top](#)

Consider the following pseudo- code

```

while (m<n)
    if (x>y ) and (a<b) then
        a=a+1
        y=y-1
    end if
m=m+1 end while
  
```

What is cyclomatic complexity of the above pseudo -code?

- A. 2      B. 3      C. 4      D. 5

**Answer key****22.2.4 Cyclomatic Complexity: ISRO2020-69** [top](#)

Consider the following pseudo-code

```

I=0; J=0; K=8;
while(I<K-1) //while-1
{
    J=J+1;
    while(J<K) //while-2
    {
        if(x[I]<x[J])
        {
            temp = x[I];
            x[I]=x[J];
            x[J]=temp;
        }
    } // end of while-2
    I=I+1;
} // end of while-1
  
```

The cyclomatic complexity of the above is

- A. 3      B. 2      C. 4      D. 1

**Answer key****22.3****Is&software Engineering (20)** [top](#)**22.3.1 Is&software Engineering: ISRO2007-76** [top](#)

Which of the following is not an approach to Software Process Assessment?

- |                        |  |
|------------------------|--|
| A. SPICE(ISO/IEC15504) | B. Standard CMMI Assessment Method for process improvement |
| C. ISO 9001:2000       | D. IEEE 2000:2001  |

**Answer key****22.3.2 Is&software Engineering: ISRO2007-77****A physical DFD specifies**

- A. what processes will be used
- B. who generates data and who processes it
- C. what each person in an organization does
- D. which data will be generated

**Answer key****22.3.3 Is&software Engineering: ISRO2011-17****A context model of a software system can be shown by drawing a**

- A. LEVEL-0 DFD
- B. LEVEL-1 DFD
- C. LEVEL-2 DFD
- D. LEVEL-3 DFD

**Answer key****22.3.4 Is&software Engineering: ISRO2011-51****Warnier Diagram enables the analyst to represent**

- A. Class structure
- B. Information Hierarchy
- C. Data Flow
- D. State Transition

**Answer key****22.3.5 Is&software Engineering: ISRO2014-20****Which of the following is not a maturity level as per Capability Maturity Model?**

- A. Initial
- B. Measurable
- C. Repeatable
- D. Optimized

**Answer key****22.3.6 Is&software Engineering: ISRO2014-69****For a software project, the spiral model was employed. When will the spiral stop?**

- A. When the software product is retired
- B. When the software product is released after Beta testing
- C. When the risk analysis is completed
- D. After completing five loops

**Answer key**

### 22.3.7 Is&software Engineering: ISRO2016-61 [top](#)



The extent to which the s/w can continue to operate correctly despite the introduction of invalid inputs is called as

- A. Reliability
- B. Robustness
- C. Fault tolerance
- D. Portability

is&software-engineering isro2016

[Answer key](#)

### 22.3.8 Is&software Engineering: ISRO2016-62 [top](#)



Which one of the following is a functional requirement ?

- A. Maintainability
- B. Portability
- C. Robustness
- D. None of the mentioned

is&software-engineering isro2016

[Answer key](#)

### 22.3.9 Is&software Engineering: ISRO2016-63 [top](#)



Configuration management is not concerned with

- A. controlling changes to the source code
- B. choice of hardware configuration for an application
- C. controllling documentation changes
- D. maintaining versions of software

non-gate is&software-engineering isro2016

[Answer key](#)

### 22.3.10 Is&software Engineering: ISRO2016-65 [top](#)



A company needs to develop a digital signal processing software for one of its newest inventions. The software is expected to have 20000 lines of code. The company needs to determine the effort in person-months needed to develop this software using the basic COCOMO model. The multiplicative factor for this model is given as 2.2 for the software development on embedded systems, while the exponentiation factor is given as 1.5. What is the estimated effort in person-months?

- A. 196.77
- B. 206.56
- C. 199.56
- D. 210.68

non-gate is&software-engineering isro2016

[Answer key](#)

### 22.3.11 Is&software Engineering: ISRO2017-58 [top](#)



Which of the following is not a life cycle model?

- A. Spiral model
- B. Prototyping model
- C. Waterfall model
- D. Capability maturity model

isro2017 is&software-engineering non-gate

[Answer key](#)

### 22.3.12 Is&software Engineering: ISRO2017-61 [top](#)



In software maintenance tackling the changes in the hardware or software environment where the software works, is

- A. Corrective maintenance
- B. Perfective maintenance
- C. Adaptive maintenance
- D. Preventive maintenance

isro2017 is&software-engineering non-gate

[Answer key](#)

### 22.3.13 Is&software Engineering: ISRO2017-65 [top](#)



Which product metric gives the measure of the average length of words and sentence in documents?

- A. SCI number
- B. Cyclomatic complexity
- C. LOC
- D. Fog index

isro2017 is&software-engineering non-gate

[Answer key](#)

### 22.3.14 Is&software Engineering: ISRO2018-47 [top](#)



In a particular program, it is found that 1% of the code account for 50% of the execution time. To code a program in C++, it takes 100 man-days. Coding in assembly language is 10 times harder than coding in C++, but runs 5 times faster. Converting an existing C++ program into an assembly language program is 4 times faster.

To completely write the program in C++ and rewrite the 1% code in assembly language, if a project team needs 13 days, the team consist of

- a. 13 programmers
- b. 10 programmers
- c. 8 programmers
- d. 100/13 programmers

isro2018 is&software-engineering

[Answer key](#)

### 22.3.15 Is&software Engineering: ISRO2018-59 [top](#)



The lower degree of cohesion is kind of:

- a. Logical Cohesion
- b. Coincidental Cohesion
- c. Procedural Cohesion
- d. Communicational Cohesion

isro2018 is&software-engineering

[Answer key](#)

### 22.3.16 Is&software Engineering: ISRO2018-76 [top](#)



Cloaking is a search engine optimization (*SEO*) technique. During cloaking:

- a. Content presented to search engine spider is different from that presented to user's browser
- b. Content present to search engine spider and browser is same

- c. Contents of user's requested website are changed
- d. None of the above

isro2018 is&software-engineering

Answer key 

### 22.3.17 Is&software Engineering: ISRO2020-64 top ↗



Regression testing is primarily related to

- A. Functional testing
- B. Development testing
- C. Data flow testing
- D. Maintenance testing

isro-2020 is&software-engineering normal

Answer key 

### 22.3.18 Is&software Engineering: ISRO2020-67 top ↗



What is the availability of the software with the following reliability figures

Mean Time Between Failures (MTBF) is 20 days

Mean Time To Repair (MTTR) is 20 hours

- A. 90%
- B. 96%
- C. 24%
- D. 50%

isro-2020 is&software-engineering normal

Answer key 

### 22.3.19 Is&software Engineering: ISRO2020-68 top ↗



What is the defect rate for Six sigma?

- A. 1.0 defect per million lines of code
- B. 1.4 defects per million lines of code
- C. 3.0 defects per million lines of code
- D. 3.4 defects per million lines of code

isro-2020 is&software-engineering normal

Answer key 

### 22.3.20 Is&software Engineering: ISRO2020-70 top ↗



In a class definition with 10 methods, to make the class maximally cohesive, number of direct and indirect connections required among the methods are

- A. 90,0
- B. 45,0
- C. 10,10
- D. 45,45

isro-2020 is&software-engineering normal

Answer key 

## 22.4

### Out Of Gate Syllabus (1) top ↗

#### 22.4.1 Out Of Gate Syllabus: GATE CSE 2014 Set 3 | Question: 19, ISRO2017-78 top ↗

In the context of modular software design, which one of the following combinations is

desirable?



- A. High cohesion and high coupling
- B. High cohesion and low coupling
- C. Low cohesion and high coupling
- D. Low cohesion and low coupling

gatecse-2014-set3 is&software-engineering easy isro2017 out-of-gate-syllabus

Answer key

22.5

### Project Cost (1)

#### 22.5.1 Project Cost: GATE CSE 2011 | Question: 5, ISRO2016-64



A company needs to develop a strategy for software product development for which it has a choice of two programming languages L1 and L2. The number lines of code (LOC) developed using L2 is estimated to be twice of the LOC developed with L1. The product will have to be maintained for five years. Various parameters for the company are given in the table below.

Parameter	Language L1	Language L2
Man years needed for development	LOC/10000	LOC/10000
Development Cost per man year	₹ 10, 00, 000	₹ 7, 50, 000
Maintenance Time	5 years	5 years
Cost of maintenance per year	₹ 1,00,000	₹ 50, 000

Total cost of the project includes cost of development and maintenance. What is the LOC for L1 for which the cost of the project using L1 is equal to the cost of the project using L2?

- A. 4000
- B. 5000
- C. 4333
- D. 4667

gatecse-2011 is&software-engineering project-cost normal isro2016

Answer key

22.6

### Software Metrics (1)

#### 22.6.1 Software Metrics: ISRO2018-58



The Functions Point (FP) metric is

- A. Calculated from user requirement
- B. Calculated from lines of code
- C. Calculated from software complexity assessment
- D. None of the above

isro2018 software-metrics is&software-engineering non-gate

Answer key

22.7

### Software Productivity (1)

#### 22.7.1 Software Productivity: ISRO2015-60



If in a software project the number of user input, user output, enquiries, files and

external interfaces are (15, 50, 24, 12, 8), respectively, with complexity average weighing factor. The productivity if effort = 70 percent-month is

- A. 110.54
- B. 408.74
- C. 304.78
- D. 220.14

isro2015 is&software-engineering software-productivity non-gate

[Answer key](#)

**22.8**

**Software Reliability (1)** [top](#)



#### **22.8.1 Software Reliability: ISRO2007-79** [top](#)

Which of the following models used for software reliability

- A. Waterfall
- B. Musa
- C. COCOMO
- D. Rayleigh

isro2007 is&software-engineering software-reliability

[Answer key](#)

**22.9**

**Software Testing (7)** [top](#)



#### **22.9.1 Software Testing: ISRO2007-67** [top](#)

To execute all loops at their boundaries and within their operational bounds is an example of

- |                      |                      |
|----------------------|----------------------|
| A. Black Box Testing | B. Alpha Testing     |
| C. Recovery Testing  | D. White Box Testing |

isro2007 is&software-engineering software-testing

[Answer key](#)



#### **22.9.2 Software Testing: ISRO2009-67** [top](#)

Activities which ensure that the software that has been built, is traceable to customer requirement is covered as part of

- A. Verification
- B. Validation
- C. Maintenance
- D. Modeling

isro2009 is&software-engineering software-testing

[Answer key](#)



#### **22.9.3 Software Testing: ISRO2009-68** [top](#)

A testing method which is normally used as the acceptance test for a software system, is

- |                       |                        |
|-----------------------|------------------------|
| A. Regression Testing | B. Integration Testing |
| C. Unit Testing       | D. System Testing      |

isro2009 is&software-engineering software-testing

[Answer key](#)

#### 22.9.4 Software Testing: ISRO2011-34 [top](#)



Black Box Software Testing method focuses on the

- A. Boundary condition of the software
- B. Control structure of the software
- C. Functional requirement of the software
- D. Independent paths of the software

isro2011 non-gate software-testing is&software-engineering

[Answer key](#)

#### 22.9.5 Software Testing: ISRO2014-23 [top](#)



The test suite (set of test input) used to perform unit testing on a module could cover 70% of the code. What is the reliability of the module if the probability of success is 0.95 during testing?

- A. 0.665 to 0.95
- B. At the most 0.665
- C. At the most 0.95
- D. At least 0.665

isro2014 is&software-engineering software-testing

[Answer key](#)

#### 22.9.6 Software Testing: ISRO2015-59 [top](#)



Alpha and Beta testing are forms of

- A. Acceptance testing
- B. Integration testing
- C. System testing
- D. Unit testing

isro2015 is&software-engineering software-testing

[Answer key](#)

#### 22.9.7 Software Testing: ISRO2018-48 [top](#)



In unit testing of a module, it is found that for a set of test data, at the maximum 90% of the code alone were tested with the probability of success 0.9. The reliability of module is

- a. Greater than 0.9
- b. Equal to 0.9
- c. At most 0.81
- d. At least 0.81

isro2018 is&software-engineering software-testing

[Answer key](#)

### 22.10

#### Spiral Model (1) [top](#)



##### 22.10.1 Spiral Model: GATE IT 2007 | Question: 4, ISRO2016-66 [top](#)

In the Spiral model of software development, the primary determinant in selecting activities in each iteration is

- A. Iteration size
- B. Cost

- C. Adopted process such as Rational Unified Process or Extreme Programming
  - D. Risk

gateit-2007 is&software-engineering spiral-model normal isro2016

## Answer key

22.11

Uml (3) top

22.11.1 Uml: ISRO2007-65 top



Which of the following is not a UML DIAGRAM?

- |                                    |   |
|------------------------------------|---|
| A. Use Case<br>C. Analysis Diagram | B. Class Diagram<br>D. Swimlane Diagram |
|------------------------------------|---|

isro2007 is&software-engineering uml

## Answer key

22.11.2 Uml: ISRO2007-78 top



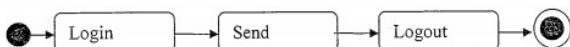
## In UML diagram of a class

- A. state of object cannot be represented
  - B. state is irrelevant
  - C. state is represented as an attribute
  - D. state is represented as a result of an operation

isro2007 is&software-engineering uml

## Answer key

22.11.3 Uml: ISRO2011-28 top



The above figure represents which one of the following UML diagram for a single send session of an online chat system?

- A. Package diagram
  - B. Activity diagram
  - C. Class diagram
  - D. Sequence diagram

isro2011 is&software-engineering uml

## Answer key

# Answer Keys

22.0.1	A	22.1.1	A	22.2.1	A	22.2.2	B	22.2.3	C
22.2.4	C	22.3.1	D	22.3.2	B	22.3.3	A	22.3.4	B
22.3.5	B	22.3.6	A	22.3.7	B	22.3.8	D	22.3.9	B
22.3.10	A	22.3.11	D	22.3.12	C	22.3.13	D	22.3.14	C
22.3.15	B	22.3.16	A	22.3.17	D	22.3.18	B	22.3.19	D

22.3.20	B	22.4.1	B	22.5.1	B	22.6.1	C	22.7.1	B
22.8.1	D	22.9.1	D	22.9.2	B	22.9.3	D	22.9.4	C
22.9.5	B	22.9.6	C	22.9.7	C	22.10.1	D	22.11.1	C
22.11.2	C	22.11.3	B						

## 23.1

Java (4) [top](#)23.1.1 Java: ISRO2011-44 [top](#)

In Java, after executing the following code what are the values of x, y and z?

```
int x,y=10; z=12;
x=y++ + z++;
```

- A. x=22, y=10, z=12
- B. x=24, y=10, z=12
- C. x=24, y=11, z=13
- D. x=22, y=11, z=13

isro2011 non-gate java

[Answer key](#)

23.1.2 Java: ISRO2011-72 [top](#)

Find the output of the following Java code line

`System.out.println(Math.floor(-7.4))`

- A. -7
- B. -8
- C. -7.4
- D. -7.0

isro2011 non-gate java

[Answer key](#)

23.1.3 Java: ISRO2014-29 [top](#)

Consider the following Java code fragment:

```
public class While
{
    public void loop()
    {
        int x = 0;
        while(1)
        {
            System.out.println("x plus one is" +(x+1));
        }
    }
}
```

- A. There is syntax error in line no. 1
- B. There is syntax errors in line nos. 1 & 6
- C. There is syntax error in line no. 8
- D. There is syntax error in line no. 6

isro2014 java non-gate

[Answer key](#)

23.1.4 Java: ISRO2017-74 [top](#)

Which of these is a super class of all errors and exceptions in the Java language?

A. Runtime Exceptions  
C. Catchable

B. Throwable  
D. None of the above

isro2017 java

**Answer key** 

## Answer Keys

23.1.1

D

23.1.2

B

23.1.3

D

23.1.4

B

## 24.1

Multimedia (2) top ↗24.1.1 Multimedia: ISRO2015-66 top ↗

Consider an uncompressed stereo audio signal of CD quality which is sampled at 44.1 kHz and quantized using 16 bits. What is required storage space if a compression ratio of 0.5 is achieved for 10 seconds of this audio?

- A. 172 KB      B. 430 KB      C. 860 KB      D. 1720 KB

isro2015   multimedia   non-gate   audio-compression

Answer key

24.1.2 Multimedia: ISRO2015-67 top ↗

What is compression ratio in a typical mp3 audio files?

- A. 4:1      B. 6:1      C. 8:1      D. 10:1

isro2015   multimedia   audio-compression

Answer key

## Answer Keys

24.1.1

C

24.1.2

D

25.0.1 ISRO2009-46 [top](#)

The shift operator  $E$  is defined as  $E[f(x_i)] = f(x_i + h)$  and  $E'[f(x_i)] = f(x_i - h)$  then  $\Delta$  (forward difference) in terms of  $E$  is

- A.  $E - 1$       B.  $E$       C.  $1 - E^{-1}$       D.  $1 - E$

isro2009

Answer key [\[w\]](#)

## 25.1

Interpolation (1) [top](#)25.1.1 Interpolation: ISRO2011-52 [top](#)

Given

X: 0 10 16

Y: 6 16 28

The interpolated value X=4 using piecewise linear interpolation is

- A. 11      B. 4      C. 22      D. 10

isro2011 interpolation non-gate

Answer key [\[w\]](#)

## 25.2

Newton Raphson (1) [top](#)25.2.1 Newton Raphson: ISRO2017-3 [top](#)

Using Newton-Raphson method, a root correct to 3 decimal places of  $x^3 - 3x - 5 = 0$

- A. 2.222      B. 2.275      C. 2.279      D. None of the above

isro2017 newton-raphson non-gate

Answer key [\[w\]](#)

## 25.3

Numerical Methods (4) [top](#)25.3.1 Numerical Methods: GATE CSE 2006 | Question: 1, ISRO2009-57 [top](#)

Consider the polynomial  $p(x) = a_0 + a_1x + a_2x^2 + a_3x^3$ , where  $a_i \neq 0, \forall i$ . The minimum number of multiplications needed to evaluate  $p$  on an input  $x$  is:

- A. 3      B. 4      C. 6      D. 9

gatecse-2006 numerical-methods normal isro2009

Answer key [\[w\]](#)

### 25.3.2 Numerical Methods: ISRO2009-44 [top](#)



A root  $\alpha$  of equation  $f(x) = 0$  can be computed to any degree of accuracy if a 'good' initial approximation  $x_0$  is chosen for which

- A.  $f(x_0) > 0$   
B.  $f(x_0)f''(x_0) > 0$   
C.  $f(x_0)f''(x_0) < 0$   
D.  $f''(x_0) > 0$

isro2009 numerical-methods

[Answer key](#)

### 25.3.3 Numerical Methods: ISRO2009-47 [top](#)

formula



The

$$\int_{x_0}^{xa} y(n)dx \simeq h/2(y_0 + 2y_1 + \dots + 2y_{n-1} + y_n) - h/12(\nabla y_n - \Delta y_0)$$

$-h/24(\nabla^2 y_n + \Delta^2 y_0) - 19h/720(\nabla^3 y_n - \Delta^3 y_0) \dots$  is called

- A. Simpson rule  
B. Trapezoidal rule  
C. Romberg's rule  
D. Gregory's formula

isro2009 numerical-methods non-gate

[Answer key](#)

### 25.3.4 Numerical Methods: ISRO2009-51 [top](#)



The formula  $P_k = y_0 + k\nabla y_0 + \frac{k(k+1)}{2}\nabla^2 y_0 + \dots + \frac{k \dots (k+n-1)}{n!}\nabla^n y_0$  is

- A. Newton's backward formula  
B. Gauss forward formula  
C. Gauss backward formula  
D. Stirling's formula

isro2009 numerical-methods

[Answer key](#)

## 25.4

### Polynomials (1) [top](#)



#### 25.4.1 Polynomials: ISRO2009-48 [top](#)

The cubic polynomial  $y(x)$  which takes the following values:  
 $y(0) = 1, y(1) = 0, y(2) = 1$  and  $y(3) = 10$  is

- A.  $x^3 + 2x^2 + 1$  B.  $x^3 + 3x^2 - 1$  C.  $x^3 + 1$  D.  $x^3 - 2x^2 + 1$

isro2009 polynomials

[Answer key](#)

## Answer Keys

25.0.1	A	25.1.1	D	25.2.1	C	25.3.1	A	25.3.2	Q-Q
25.3.3	B	25.3.4	A	25.4.1	D				

## 26.1

Object Oriented Programming (4) [top](#)26.1.1 Object Oriented Programming: ISRO2009-33 [top](#)

The feature in object-oriented programming that allows the same operation to be carried out differently, depending on the object, is

- A. Inheritance
- B. Polymorphism
- C. Overfunctioning
- D. Overriding

isro2009 object-oriented-programming non-gate

[Answer key](#)

26.1.2 Object Oriented Programming: ISRO2016-78 [top](#)

If a class  $C$  is derived from class  $B$ , which is derived form class  $A$ , all through public inheritance, then a class  $C$  member function can access

- A. only protected and public data of  $C$  and  $B$
- B. Only protected and public data of  $C$
- C. all data of  $C$  and private data of  $A$  and  $B$
- D. public and protected data of  $A$  and  $B$  and all data of  $C$

non-gate object-oriented-programming isro2016

[Answer key](#)

26.1.3 Object Oriented Programming: ISRO2017-43 [top](#)

Which of the following UML 2.0 diagrams capture behavioral aspects of a system?

- A. Use case diagram, Object diagram, Activity diagram and state machine diagram
- B. Use case diagram, Activity diagram and state machine diagram
- C. Object diagram, Communication Diagram, Timing diagram and Interaction diagram
- D. Object diagram, Composite structure diagram, package diagram and Deployment diagram

isro2017 object-oriented-programming non-gate

[Answer key](#)

26.1.4 Object Oriented Programming: ISRO2017-44 [top](#)

Which of the following is associated with objects?

- A. State
- B. Behavior
- C. Identity
- D. All of the above

isro2017 object-oriented-programming non-gate

[Answer key](#)

## 26.2

Operator Overloading (1) [top](#)

26.2.1 Operator Overloading: ISRO2017-42 top



Which of the following operator(s) cannot be overloaded?

- A. ..(member Access or Dot operator)
  - B. ?: (ternary or Conditional Operator)
  - C. :: ( Scope Resolution Operator)
  - D. All of the above

isro2017 programming-in-c operator-overloading

Answer key

26.3

Programming In C (1) top

26.3.1 Programming In C: ISRO2008-73 top



We can make a class abstract by

- A. Declaring it abstract using the virtual keyword
  - B. Making at least one member function as virtual function
  - C. Making at least one member function as pure virtual function
  - D. Making all member function const.

isro2008 non-gate programming-in-c

## Answer key

# Answer Keys

26.1.1	B	26.1.2	D	26.1.3	B	26.1.4	D	26.2.1	D
26.3.1	C								

27.0.1 ISRO2018-20 [top](#)

Determine the number of page faults when references to pages occur in the order - 1, 2, 4, 5, 2, 1, 2, 4. Assume that the main memory can accommodate 3 pages and the main memory already has the pages 1 and 2, with page 1 having been brought earlier than page 2. (assume LRU i.e. Least-Recently-Used algorithm is applied)

- a. 3
- b. 4
- c. 5
- d. None of the above

[Answer key](#)

## 27.1

Binary Heap (1) [top](#)27.1.1 Binary Heap: ISRO2018-57 [top](#)

Given a binary-max heap. The elements are stored in an array as 25, 14, 16, 13, 10, 8, 12. What is the content of the array after two delete operations?

- a. 14, 13, 8, 12, 10
- b. 14, 12, 13, 10, 8
- c. 14, 13, 12, 8, 10
- d. 14, 13, 12, 10, 8

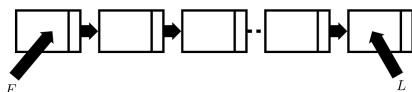
isro2018 data-structures binary-heap

[Answer key](#)

## 27.2

Linked List (2) [top](#)27.2.1 Linked List: ISRO2018-63 [top](#)

Consider a singly linked list of the form where  $F$  is a pointer to the first element in the linked list and  $L$  is the pointer to the last element in the list. The time of which of the following operations depends on the length of the list?



- a. Delete the last element of the list
- b. Delete the first element of the list
- c. Add an element after the last element of the list
- d. Interchange the first two elements of the list

isro2018 linked-list data-structures

[Answer key](#)

27.2.2 Linked List: ISRO2018-79 [top](#)

A doubly linked list is declared as:

```
struct Node {
    int Value;
    struct Node *Fwd;
    struct Node *Bwd;
```

};

Where Fwd and Bwd represent forward and backward link to the adjacent elements of the list. Which of the following segment of code deletes the node pointed to by  $X$  from the doubly linked list, if it is assumed that  $X$  points to neither the first nor the last node of the list?

- a.  $X \rightarrow \text{Bwd} \rightarrow \text{Fwd} = X \rightarrow \text{Fwd}; X \rightarrow \text{Fwd} \rightarrow \text{Bwd} = X \rightarrow \text{Bwd};$
- b.  $X \rightarrow \text{Bwd}. \text{Fwd} = X \rightarrow \text{Fwd}; X. \text{Fwd} \rightarrow \text{Bwd} = X \rightarrow \text{Bwd};$
- c.  $X. \text{Bwd} \rightarrow \text{Fwd} = X. \text{Bwd}; X \rightarrow \text{Fwd}. \text{Bwd} = X. \text{Bwd};$
- d.  $X \rightarrow \text{Bwd} \rightarrow \text{Fwd} = X \rightarrow \text{Bwd}; X \rightarrow \text{Fwd} \rightarrow \text{Bwd} = X \rightarrow \text{Fwd};$

isro2018 linked-list data-structures

Answer key 

27.3

Neural Network (1) [top](#)



27.3.1 Neural Network: ISRO2018-75 [top](#)

In neural network, the network capacity is defined as:

- a. The traffic (tarry capacity of the network)
- b. The total number of nodes in the network
- c. The number of patterns that can be stored and recalled in a network
- d. None of the above

isro2018 non-gate neural-network

Answer key 

27.4

Semiconductor (1) [top](#)



27.4.1 Semiconductor: ISRO2011-64 [top](#)

When n-type semiconductor is heated?

- A. number of electrons increases while that of holes decreases
- B. number of holes increases while that of electrons decreases
- C. number of electrons and holes remain the same
- D. number of electron and holes increases equally

isro2011 semiconductor non-gate

Answer key 

27.5

Unix (1) [top](#)



27.5.1 Unix: ISRO2011-57 [top](#)

Which of the following UNIX command allows scheduling a program to be executed at the specifies time?

A. cron

B. nice

C. date and time D. schedule

isro2011 unix non-gate

Answer key 

## Answer Keys

27.0.1	B
27.4.1	B

27.1.1	C
27.5.1	A

27.2.1	A
27.3.1	C

27.2.2	A
27.3.1	C

## 28.1

Html (3) [top](#)28.1.1 Html: ISRO2011-75 [top](#)

In HTML, which of the following can be considered a container?

- A. <SELECT>
- B. <Value>
- C. <INPUT>
- D. <BODY>

[isro2011](#) [non-gate](#) [web-technologies](#) [html](#)

[Answer key](#)

28.1.2 Html: ISRO2015-45 [top](#)

To add a background color for all <h1> elements, which of the following HTML syntax is used

- A. h1 { background-color :#FFFFFF }
- B. { background-color :#FFFFFF } . h1
- C. h1 { background-color :#FFFFFF } . h1(all)
- D. h1. all{bgcolor= #FFFFFF}

[isro2015](#) [html](#) [non-gate](#)

[Answer key](#)

28.1.3 Html: ISRO2017-75 [top](#)

Choose the most appropriate HTML tag in the following to create a numbered list

- A. <dl>
- B. <list>
- C. <ul>
- D. <ol>

[isro2017](#) [web-technologies](#) [html](#) [non-gate](#)

[Answer key](#)

## 28.2

Javascript (1) [top](#)28.2.1 Javascript: ISRO2015-46 [top](#)

The correct syntax to write "Hi there" in Javascript is

- A. jscript.write ("Hi There")
- B. response.write ("Hi There")
- C. print ("Hi There")
- D. print.jscript ("Hi There")

[javascript](#) [non-gate](#) [isro2015](#)

[Answer key](#)

## 28.3

Web Technologies (4) [top](#)28.3.1 Web Technologies: GATE IT 2008 | Question: 19, ISRO2016-76 [top](#)

Which of the following is TRUE only of XML but NOT HTML?

- A. It is derived from SGML
- B. It describes content and layout
- C. It allows user defined tags
- D. It is restricted only to be used with web browsers

**Answer key****28.3.2 Web Technologies: ISRO2007-72**

An email contains a textual birthday greeting, a picture of a cake and a song. The order is not important. What is the content-type?

- A. Multipart/mixed
- B. Multipart/parallel
- C. Multipart/digest
- D. Multipart/alternative

**Answer key****28.3.3 Web Technologies: ISRO2014-76**

A web client sends a request to a web server. The web server transmits a program to that client and it is executed at client. It creates a web document. What are such web documents called?

- A. Active
- B. Static
- C. Dynamic
- D. Passive

**Answer key****28.3.4 Web Technologies: ISRO2017-40**

XPath is used to navigate through elements and attributes in

- A. XSL document
- B. XML document
- C. XHTML document
- D. XQuery document

**Answer key****28.4****Xml (1)****28.4.1 Xml: ISRO2015-47**

To declare the version of XML, the correct syntax is

- A. <?xml version='1.0'/?>
- B. <\*xml version='1.0'/?>
- C. <?xml version="1.0"/>
- D. <xml version='1.0'/?>

**Answer key****Answer Keys**

28.1.1	D	28.1.2	A	28.1.3	D	28.2.1	X	28.3.1	C
28.3.2	B	28.3.3	A	28.3.4	B	28.4.1	C		

29.0.1 ISRO2009-10 top ↗

The correct matching of the following pairs is

A.	Disk check	i.	Round robin
B.	Batch processing	ii.	Scan
C.	Time sharing	iii.	LIFO
D.	Stack operation	iv.	FIFO

1. a-iii, b-iv, c-ii, d-i
2. a-iv, b-iii, c-ii, d-i
3. a-iii, b-iv, c-i, d-ii
4. a-ii, b-iv, c-i, d-iii

isro2009 operating-system

**Answer key ↗**

29.0.2 ISRO2014-66 top ↗

Consider a system where each file is associated with a 16 bit number. For each file, each user should have the read and write capability. How much memory is needed to store each user's access data?

- A. 16 KB      B. 32 KB      C. 64 KB      D. 128 KB

isro2014 operating-system

**Answer key ↗**

29.0.3 ISRO2008-60 top ↗

Overlaying

- |                                    |   |
|------------------------------------|---|
| A. requires use of a loader        | B. allows larger programs, but requires more effort |
| C. is most used on large computers | D. is transparent to the user                       |

isro2008

**Answer key ↗**

29.0.4 ISRO2009-8 top ↗

The primary purpose of an operating system is

- A. To make most efficient use of the computer hardware
- B. To allow people to use the computer
- C. To keep systems programmers employed
- D. To make computers easier to use

**Answer key****29.0.5 ISRO2018-67** top

In multi-programmed systems, it is advantageous if some programs such as editors and compilers can be shared by several users.

Which of the following must be true of multi-programmed systems in order that a single copy of a program can be shared by several users?

- I. The program is a macro
  - II. The program is recursive
  - III. The program is reentrant
- a. I only      b. II only      c. III only      d. I, II and III

**Answer key****29.0.6 ISRO2009-77** top

When a process is rolled back as a result of deadlock the difficulty which arises is

- |                           |                      |
|---------------------------|----------------------|
| A. Starvation             | B. System throughput |
| C. Low device utilization | D. Cycle stealing    |

**Answer key****29.0.7 ISRO2007-25** top

What is the name of the technique in which the operating system of a computer executes several programs concurrently by switching back and forth between them?

- A. Partitioning
- B. Multi-tasking
- C. Windowing
- D. Paging

**Answer key****29.0.8 ISRO2009-75** top

Special software to create a job queue is called a

- A. Driver
- B. Spooler
- C. Interpreter
- D. Linkage editor

**Answer key****29.0.9 ISRO2011-55** top

There are three processes in the ready queue. When the currently running process requests for I/O how many process switches take place?

- A. 1
- B. 2
- C. 3
- D. 4

**Answer key****29.0.10 ISRO2008-52** [top](#)

Dynamic address translation

- A. is part of the operating system paging algorithm
- B. is useless when swapping is used
- C. is the hardware necessary to implement paging
- D. storage pages at a specific location on disk

**Answer key****29.0.11 ISRO2007-64, ISRO2008-50** [top](#)

Feedback queues

- A. are very simple to implement
- B. dispatch tasks according to execution characteristics
- C. are used to favour real time tasks
- D. require manual intervention to implement properly

**Answer key****29.0.12 ISRO2008-54** [top](#)

What is the name of the operating system that reads and reacts in terms of operating system?

- |                     |                        |
|---------------------|------------------------|
| A. Batch system     | B. Quick response time |
| C. real time system | D. Time sharing system |

**Answer key****29.0.13 ISRO2008-58** [top](#)

Checkpointing a job

- |   |   |
|---|---|
| A. allows it to be completed successfully | B. allows it to continue executing later    |
| C. prepares it for finishing              | D. occurs only when there is an error in it |

**Answer key****29.1****Concurrency (1)** [top](#)

## 29.1.1 Concurrency: ISRO2011-77 [top](#)



In a system using single processor, a new process arrives at the rate of six processes per minute and each such process requires seven seconds of service time. What is the CPU utilization?

- A. 70%
- B. 30%
- C. 60%
- D. 64%

isro2011 operating-system concurrency

[Answer key](#)

## 29.2

## Context Switch (2) [top](#)

### 29.2.1 Context Switch: GATE CSE 2000 | Question: 1.20, ISRO2008-47 [top](#)



Which of the following need not necessarily be saved on a context switch between processes?

- A. General purpose registers
- B. Translation look-aside buffer
- C. Program counter
- D. All of the above

gatecse-2000 operating-system easy isro2008 context-switch

[Answer key](#)

### 29.2.2 Context Switch: ISRO2008-64 [top](#)



Which of the following need not necessarily be saved on a Context Switch between processes?

- A. General purpose registers
- B. Translation look-aside buffer
- C. Program counter
- D. Stack pointer

isro2008 operating-system context-switch

[Answer key](#)

## 29.3

## Critical Section (1) [top](#)

### 29.3.1 Critical Section: ISRO2017-68 [top](#)



A critical region

- A. is a piece of code which only one process executes at a time
- B. is a region prone to deadlock
- C. is a piece of code which only a finite number of processes execute
- D. is found only in windows NT operating system

isro2017 operating-system critical-section process-synchronization

[Answer key](#)

## 29.4

## Deadlock Prevention Avoidance Detection (2) [top](#)

#### 29.4.1 Deadlock Prevention Avoidance Detection: ISRO2018-21 [top](#)



Consider a system having  $m$  resources of the same type. These resources are shared by 3 processes  $A, B, C$ , which have peak time demands of 3, 4, 6 respectively. The minimum value of  $m$  that ensures that deadlock will never occur is:

- a. 11
- b. 12
- c. 13
- d. 14

isro2018 deadlock-prevention-avoidance-detection operating-system

[Answer key](#)

#### 29.4.2 Deadlock Prevention Avoidance Detection: ISRO2020-29 [top](#)



An aid to determine the deadlock occurrence is

- A. resource allocation graph
- B. starvation graph
- C. inversion graph
- D. none of the above

isro-2020 operating-system deadlock-prevention-avoidance-detection easy

[Answer key](#)

### 29.5

#### Disk (11) [top](#)



##### 29.5.1 Disk: GATE CSE 1999 | Question: 2-18, ISRO2008-46 [top](#)

Raid configurations of the disks are used to provide

- A. Fault-tolerance
- B. High speed
- C. High data density
- D. (A) & (B)

gate1999 operating-system disk easy isro2008

[Answer key](#)

##### 29.5.2 Disk: GATE CSE 2003 | Question: 25, ISRO2009-12 [top](#)



Using a larger block size in a fixed block size file system leads to

- A. better disk throughput but poorer disk space utilization
- B. better disk throughput and better disk space utilization
- C. poorer disk throughput but better disk space utilization
- D. poorer disk throughput and poorer disk space utilization

gatcse-2003 operating-system disk normal isro2009

[Answer key](#)

##### 29.5.3 Disk: GATE CSE 2007 | Question: 11, ISRO2009-36, ISRO2016-21 [top](#)



Consider a disk pack with 16 surfaces, 128 tracks per surface and 256 sectors per track. 512 bytes of data are stored in a bit serial manner in a sector. The capacity of the disk pack and the number of bits required to specify a particular sector in the disk are respectively:

- A. 256 Mbyte, 19 bits
- B. 256 Mbyte, 28 bits
- C. 512 Mbyte, 20 bits
- D. 64 Gbyte, 28 bits

**Answer key****29.5.4 Disk: GATE IT 2007 | Question: 44, ISRO2015-34**

A hard disk system has the following parameters :

- Number of tracks = 500
- Number of sectors/track = 100
- Number of bytes /sector = 500
- Time taken by the head to move from one track to adjacent track = 1 ms
- Rotation speed = 600 rpm.

What is the average time taken for transferring 250 bytes from the disk ?

- A. 300.5 ms      B. 255.5 ms      C. 255 ms      D. 300 ms

**Answer key****29.5.5 Disk: ISRO2007-39**

Disk requests are received by a disk drive for cylinder 5, 25, 18, 3, 39, 8 and 35 in that order. A seek takes 5 msec per cylinder moved. How much seek time is needed to serve these requests for a Shortest Seek First (SSF) algorithm? Assume that the arm is at cylinder 20 when the last of these requests is made with none of the requests yet served

- A. 125 msec      B. 295 msec      C. 575 msec      D. 750 msec

**Answer key****29.5.6 Disk: ISRO2007-56**

Which of the following RAID level provides the highest Data Transfer Rate (Read/Write)

- A. RAID 1      B. RAID 3      C. RAID 4      D. RAID 5

**Answer key****29.5.7 Disk: ISRO2008-49**

The total time to prepare a disk drive mechanism for a block of data to be read from it is

- |                           |                      |
|---------------------------|----------------------|
| A. seek time              | B. latency           |
| C. latency plus seek time | D. transmission time |

**Answer key**

### 29.5.8 Disk: ISRO2009-36 [top](#)



Consider a disk pack with 16 surfaces, 128 tracks per surface and 256 sectors per track. 512 bytes of data are stored in a bit serial manner in a sector. The capacity of the disk pack and the number of bits required to specify a particular sector in the disk are respectively

- A. 256 Mbyte, 19 bits
- B. 256 Mbyte, 28 bits
- C. 512 Mbyte, 20 bits
- D. 64 Gbyte, 28 bits

isro2009 operating-system disk

[Answer key](#)

### 29.5.9 Disk: ISRO2011-38 [top](#)



A fast wide SCSI-II disk drive spins at 7200 RPM, has a sector size of 512 bytes, and holds 160 sectors per track. Estimate the sustained transfer rate of this drive

- A. 576000 Kilobytes / sec
- B. 9600 Kilobytes / sec
- C. 4800 Kilobytes / sec
- D. 19200 Kilobytes / sec

isro2011 operating-system disk

[Answer key](#)

### 29.5.10 Disk: ISRO2018-23 [top](#)



Disk requests come to a disk driver for cylinders in the order 10, 22, 20, 2, 40, 6 and 38 at a time when the disk drive is reading from cylinder 20. The seek time is 6 ms/cylinder. The total seek time, if the disk arm scheduling algorithms is first-come-first-served is

- a. 360
- b. 850
- c. 900
- d. None of the above

isro2018 disk operating-system

[Answer key](#)

### 29.5.11 Disk: ISRO2018-50 [top](#)



A particular disk unit uses a bit string to record the occupancy or vacancy of its tracks, with 0 denoting vacant and 1 for occupied. A 32-bit segment of this string has hexadecimal value D4FE2003. The percentage of occupied tracks for the corresponding part of the disk, to the nearest percentage is:

- a. 12
- b. 25
- c. 38
- d. 44

isro2018 disk operating-system

[Answer key](#)

## 29.6

### Disk Scheduling (2) [top](#)



#### 29.6.1 Disk Scheduling: ISRO2014-14 [top](#)

There are 200 tracks on a disc platter and the pending requests have come in the order - 36, 69, 167, 76, 42, 51, 126, 12 and 199. Assume the arm is located at the 100<sup>th</sup> track and moving towards track 200. If sequence of disc access is 126, 167, 199, 12,

36, 42, 51, 69 and 76 then which disc access scheduling policy is used?

- A. Elevator
- B. Shortest seek-time first
- C. C-SCAN
- D. First Come First Served

disk-scheduling isro2014 operating-system

Answer key 



#### 29.6.2 Disk Scheduling: ISRO2017-66 [top](#)

Consider the disk system with 100 cylinders. The request to access the cylinders occur in the following sequence.

**4, 37, 10, 7, 19, 73, 2, 15, 6, 20**

Assuming the head is currently at cylinder 50 what is the time taken to satisfy all requests if it takes 1 ms to move from one cylinder to adjacent one and shortest seek time first algorithm is used.

- A. 95 ms
- B. 119 ms
- C. 233 ms
- D. 276 ms

isro2017 operating-system disk-scheduling

Answer key 

### 29.7

#### Fork System Call (4) [top](#)



#### 29.7.1 Fork System Call: ISRO2008-63 [top](#)

Fork is

- A. the creation of a new job
- B. the dispatching of a task
- C. increasing the priority of a task
- D. the creation of a new process

isro2008 operating-system fork-system-call

Answer key 



#### 29.7.2 Fork System Call: ISRO2015-37 [top](#)

Consider the following program.

```
main()
{
    fork();
    fork();
    fork();
}
```

How many new processes will be created?

- A. 8
- B. 6
- C. 7
- D. 5

isro2015 operating-system fork-system-call

Answer key 



#### 29.7.3 Fork System Call: ISRO2017-51 [top](#)

What is the output of the following program?

```
main()
```

```
{
    int a = 10;
    if(fork() == 0))
        a++;
    printf("%d\n",a);
}
```

- A. 10 and 11      B. 10      C. 11      D. 11 and 11

isro2017 operating-system fork-system-call

[Answer key](#)



#### 29.7.4 Fork System Call: ISRO2018-4 [top](#)

The following C program:

```
{
    fork(); fork(); printf("yes");
}
```

If we execute this core segment, how many times the string yes will be printed?

- a. Only once      b. 2 times      c. 4 times      d. 8 times

isro2018 fork-system-call operating-system

[Answer key](#)



### 29.8

#### Io Handling (2) [top](#)

##### 29.8.1 Io Handling: GATE CSE 1996 | Question: 1.20, ISRO2008-56 [top](#)

Which of the following is an example of spooled device?

- A. A line printer used to print the output of a number of jobs
- B. A terminal used to enter input data to a running program
- C. A secondary storage device in a virtual memory system
- D. A graphic display device

gate1996 operating-system io-handling normal isro2008

[Answer key](#)



##### 29.8.2 Io Handling: GATE IT 2004 | Question: 11, ISRO2011-33 [top](#)

What is the bit rate of a video terminal unit with 80 characters/line, 8 bits/character and horizontal sweep time of 100  $\mu$ s (including 20  $\mu$ s of retrace time)?

- A. 8 Mbps      B. 6.4 Mbps      C. 0.8 Mbps      D. 0.64 Mbps

gateit-2004 operating-system io-handling easy isro2011

[Answer key](#)



### 29.9

#### Least Recently Used (1) [top](#)

### 29.9.1 Least Recently Used: ISRO2016-48 [top](#)



Determine the number of page faults when references to pages occur in the following order:

1, 2, 4, 5, 2, 1, 2, 4

Assume that the main memory can accommodate 3 pages and the main memory already has the pages 1 and 2, with page one having been brought earlier than page 2. (LRU page replacement algorithm is used)

- A. 3
- B. 5
- C. 4
- D. None of these

page-replacement least-recently-used isro2016 operating-system

[Answer key](#)

## 29.10

### Memory Management (3) [top](#)



#### 29.10.1 Memory Management: ISRO2018-22 [top](#)

A computer has  $1000K$  of main memory. The jobs arrive and finish in the following sequence.

Job 1 requiring  $200 K$  arrives

Job 2 requiring  $350 K$  arrives

Job 3 requiring  $300 K$  arrives

Job 1 finishes

Job 4 requiring  $120 K$  arrives

Job 5 requiring  $150 K$  arrives

Job 6 requiring  $80 K$  arrives

Among best fit and first fit, which performs better for this sequence?

- a. First fit
- b. Best fit
- c. Both perform the same
- d. None of the above

isro2018 memory-management operating-system

[Answer key](#)



#### 29.10.2 Memory Management: ISRO2018-61 [top](#)

The Operating System of a computer may periodically collect all the free memory space to form contiguous block of free space. This is called:

- a. Concatenation
- b. Garbage Collection
- c. Collision
- d. Dynamic Memory Allocation

isro2018 memory-management operating-system

[Answer key](#)



#### 29.10.3 Memory Management: ISRO2020-25 [top](#)

What is compaction refers to

- A. a technique for overcoming internal fragmentation
- B. a paging technique

- C. a technique for overcoming external fragmentation
- D. a technique for compressing the data

isro-2020 operating-system memory-management easy

Answer key 

29.11

Mutual Exclusion (1) [top](#)

#### 29.11.1 Mutual Exclusion: ISRO2020-57 [top](#)



The hardware implementation which provides mutual exclusion is

- A. Semaphores
- B. Test and set instructions
- C. Both options
- D. None of the options

isro-2020 operating-system semaphore mutual-exclusion normal

Answer key 

29.12

Page Fault (1) [top](#)

#### 29.12.1 Page Fault: ISRO2020-30 [top](#)



Consider the following page reference string.

1 2 3 4 2 1 5 6 2 1 2 3 7 6 3 2 1 2 3 6

What are the minimum number of frames required to get a single page fault for the above sequence assuming LRU replacement strategy?

- A. 7
- B. 4
- C. 6
- D. 5

isro-2020 operating-system memory-management page-replacement page-fault normal

Answer key 

29.13

Page Replacement (9) [top](#)

#### 29.13.1 Page Replacement: GATE CSE 1997 | Question: 3.10, ISRO2008-57, ISRO2015-64 [top](#)



Dirty bit for a page in a page table

- A. helps avoid unnecessary writes on a paging device
- B. helps maintain LRU information
- C. allows only read on a page
- D. None of the above

gate1997 operating-system page-replacement easy isro2008 isro2015

Answer key 

#### 29.13.2 Page Replacement: GATE CSE 2004 | Question: 21, ISRO2007-44 [top](#)



The minimum number of page frames that must be allocated to a running process in a virtual memory environment is determined by

- A. the instruction set architecture
- B. page size
- C. number of processes in memory
- D. physical memory size

**Answer key****29.13.3 Page Replacement: GATE CSE 2005 | Question: 22, ISRO2015-36**

Increasing the RAM of a computer typically improves performance because:

- A. Virtual Memory increases
- B. Larger RAMs are faster
- C. Fewer page faults occur
- D. Fewer segmentation faults occur

**Answer key****29.13.4 Page Replacement: GATE CSE 2009 | Question: 9, ISRO2016-52**

In which one of the following page replacement policies, Belady's anomaly may occur?

- A. FIFO
- B. Optimal
- C. LRU
- D. MRU

**Answer key****29.13.5 Page Replacement: ISRO2007-10**

The term 'aging' refers to

- A. booting up the priority of the process in multi-level of queue without feedback.
- B. gradually increasing the priority of jobs that wait in the system for a long time to remedy infinite blocking
- C. keeping track of the following a page has been in memory for the purpose of LRU replacement
- D. letting job reside in memory for a certain amount of time so that the number of pages required can be estimated accurately.

**Answer key****29.13.6 Page Replacement: ISRO2008-53**

Thrashing

- A. always occurs on large computers
- B. is a natural consequence of virtual memory systems
- C. can always be avoided by swapping
- D. can be caused by poor paging algorithms

**Answer key**

### 29.13.7 Page Replacement: ISRO2008-67 [top](#)



The page replacement algorithm which gives the lowest page fault rate is

- A. LRU
- B. FIFO
- C. Optimal page replacement
- D. Second chance algorithm

isro2008 operating-system page-replacement

[Answer key](#)

### 29.13.8 Page Replacement: ISRO2017-52 [top](#)



Given reference to the following pages by a program

**0,9,0,1,8,1,8,7,8,7,1,2,8,2,7,8,2,3,8,3**

How many page faults will occur if the program has three page frames available to it and uses an optimal replacement?

- A. 7
- B. 8
- C. 9
- D. None of the above

isro2017 operating-system page-replacement

[Answer key](#)

### 29.13.9 Page Replacement: ISRO2018-20 [top](#)



Determine the number of page faults when references to pages occur in the order 1, 2, 4, 5, 2, 1, 2, 4. Assume that the main memory can accommodate 3 pages and the main memory already has the pages 1 and 2, with page 1 brought earlier than page 2. (assume LRU i.e., Least-Recently-Used algorithm is applied)

- A. 3
- B. 4
- C. 5
- D. None of the above

isro2018 operating-system page-replacement

[Answer key](#)

## 29.14

### Paging (7) [top](#)



#### 29.14.1 Paging: ISRO2011-24 [top](#)

If the page size in a 32-bit machine is 4K bytes then the size of page table is

- A. 1 M bytes
- B. 2 M bytes
- C. 4 M bytes
- D. 4 K bytes

isro2011 operating-system paging virtual-memory

[Answer key](#)

#### 29.14.2 Paging: ISRO2011-73 [top](#)



Belady's anomaly means

- A. Page fault rate is constant even on increasing the number of allocated frames
- B. Page fault rate may increase on increasing the number of allocated frames
- C. Page fault rate may increase on decreasing the number of allocated frames
- D. Page fault rate may decrease on increasing the number of allocated frames

**Answer key****29.14.3 Paging: ISRO2014-35**

Using the page table shown below, translate the physical address 25 to virtual address. The address length is 16 bits and page size is 2048 words while the size of the physical memory is four frames.

Page	Present (1-In, 0-Out)	Frame
0	1	3
1	1	2
2	1	0
3	0	—

- A. 25      B. 6169      C. 2073      D. 4121

**Answer key****29.14.4 Paging: ISRO2014-44**

A computer has 16 pages of virtual address space but the size of main memory is only four frames. Initially the memory is empty. A program references the virtual pages in the order 0, 2, 4, 5, 2, 4, 3, 11, 2, 10. How many page faults occur if LRU page replacement algorithm is used?

- A. 3      B. 5      C. 7      D. 8

**Answer key****29.14.5 Paging: ISRO2014-70**

Dirty bit is used to indicate which of the following?

- |   |                              |
|---|------------------------------|
| A. A page fault has occurred                              | B. A page has corrupted data |
| C. A page has been modified after being loaded into cache | D. An illegal access of page |

**Answer key****29.14.6 Paging: ISRO2014-77**

What is the size of the physical address space in a paging system which has a page table containing 64 entries of 11 bit each (including valid and invalid bit) and a page size of 512 bytes?

- A.  $2^{11}$       B.  $2^{15}$       C.  $2^{19}$       D.  $2^{20}$

[Answer key](#)

### 29.14.7 Paging: ISRO2016-22 [top](#)



Let the page fault service time be 10 ms in a computer with average memory access time being 20 ns. If one page fault is generated for every  $10^6$  memory accesses, what is the effective access time for the memory?

- A. 21.4 ns
- B. 29.9 ns
- C. 23.5 ns
- D. 35.1 ns

operating-system virtual-memory paging isro2016

[Answer key](#)

### 29.15

### Pipes (1) [top](#)



#### 29.15.1 Pipes: ISRO2018-13 [top](#)

The difference between a named pipe and a regular file in Unix is that

- a. Unlike a regular file, named pipe is a special file
- b. The data in a pipe is transient, unlike the content of a regular file
- c. Pipes forbid random accessing, while regular files do allow this.
- d. All of the above

isro2018 operating-system pipes non-gate

[Answer key](#)

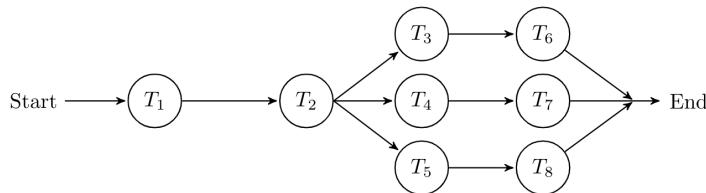
### 29.16

### Precedence Graph (1) [top](#)



#### 29.16.1 Precedence Graph: ISRO2011-10 [top](#)

Below is the precedence graph for a set of tasks to be executed on a parallel processing system  $S$ .



What is the efficiency of this precedence graph on  $S$  if each of the tasks  $T_1, \dots, T_8$  takes the same time and the system  $S$  has five processors?

- A. 25%
- B. 40%
- C. 50%
- D. 90%

isro2011 operating-system concurrency precedence-graph

[Answer key](#)

### 29.17

### Process (3) [top](#)

### 29.17.1 Process: ISRO2007-41 [top](#)



A task in a blocked state

- A. is executable
- B. is running
- C. must still be placed in the run queues
- D. is waiting for some temporarily unavailable resources

isro2007 operating-system process

[Answer key](#)

### 29.17.2 Process: ISRO2009-76 [top](#)



Process is

- A. A program in high level language kept on disk
- B. Contents of main memory
- C. A program in execution
- D. A job in secondary memory

isro2009 operating-system process

[Answer key](#)

### 29.17.3 Process: ISRO2009-9 [top](#)



Which is the correct definition of a valid process transition in an operating system?

- A. Wake up: ready → running
- B. Dispatch: ready → running
- C. Block: ready → running
- D. Timer runout: → ready → running

isro2009 operating-system process

[Answer key](#)

## 29.18

### Process Scheduling (16) [top](#)



#### 29.18.1 Process Scheduling: GATE CSE 1996 | Question: 2.20, ISRO2008-15 [top](#)

Four jobs to be executed on a single processor system arrive at time 0 in the order  $A, B, C, D$ . Their burst CPU time requirements are 4, 1, 8, 1 time units respectively. The completion time of  $A$  under round robin scheduling with time slice of one time unit is

- A. 10
- B. 4
- C. 8
- D. 9

gate1996 operating-system process-scheduling normal isro2008

[Answer key](#)

#### 29.18.2 Process Scheduling: GATE CSE 2006 | Question: 06, ISRO2009-14 [top](#)



Consider three CPU-intensive processes, which require 10, 20 and 30 time units and arrive at times 0, 2 and 6, respectively. How many context switches are needed if the operating system implements a shortest remaining time first scheduling algorithm? Do not count the context switches at time zero and at the end.

- A. 1
- B. 2
- C. 3
- D. 4

gatcse-2006 operating-system process-scheduling normal isro2009

[Answer key](#)

### 29.18.3 Process Scheduling: ISRO2007-11, GATE CSE 2001 | Question: 1.19 [top](#)



Consider a set of  $n$  tasks with known runtimes  $r_1, r_2, \dots, r_n$  to be run on a uniprocessor machine. Which of the following processor scheduling algorithms will result in the maximum throughput?

- A. Round Robin
- B. Shortest job first
- C. Highest response ratio next
- D. first come first served

isro2007 operating-system process-scheduling gatecse-2001

[Answer key](#)

### 29.18.4 Process Scheduling: ISRO2007-12 [top](#)



Consider a job scheduling problem with 4 jobs  $J_1, J_2, J_3$  and  $J_4$  with corresponding deadlines:  $(d_1, d_2, d_3, d_4) = (4, 2, 4, 2)$ . Which of the following is not a feasible schedule without violating any job schedule?

- A.  $J_2, J_4, J_1, J_3$
- B.  $J_4, J_1, J_2, J_3$
- C.  $J_4, J_2, J_1, J_3$
- D.  $J_4, J_2, J_3, J_1$

isro2007 operating-system process-scheduling

[Answer key](#)

### 29.18.5 Process Scheduling: ISRO2007-17 [top](#)



Round Robin schedule is essentially the pre-emptive version of

- A. FIFO
- B. Shortest job first
- C. Shortest remaining time
- D. Longest remaining time

isro2007 operating-system process-scheduling

[Answer key](#)

### 29.18.6 Process Scheduling: ISRO2007-43 [top](#)



On a system using non-preemptive scheduling, processes with expected run times of 5, 18, 9 and 12 are in the ready queue. In what order should they be run to minimize wait time?

- A. 5, 12, 9, 18
- B. 5, 9, 12, 18
- C. 12, 18, 9, 5
- D. 9, 12, 18, 5

isro2007 operating-system process-scheduling

[Answer key](#)

### 29.18.7 Process Scheduling: ISRO2008-51 [top](#)



With Round-Robin CPU scheduling in a time shared system

- A. using very large time slices (quantas) degenerates into First-Come First served (FCFS) algorithm.
- B. using extremely small time slices improves performance
- C. using very small time slices degenerates into Last-In First-Out (LIFO) algorithm.
- D. using medium sized times slices leads to shortest Request time First (SRTF) algorithm

**Answer key****29.18.8 Process Scheduling: ISRO2008-66, ISRO2009-15**

The performance of Round Robin algorithm depends heavily on

- A. size of the process  
 C. the CPU bursts of the process
- B. the I/O bursts of the process  
 D. the size of the time quantum

**Answer key****29.18.9 Process Scheduling: ISRO2009-17**

Consider a set of 5 processes whose arrival time, CPU time needed and the priority are given below:

Process Priority	Arrival Time ms	CPU Time Needed (in ms)	Priority
P1	0	10	5
P2	0	5	2
P3	2	3	1
P4	5	20	4
P5	10	2	3

(smaller the number, higher the priority)

If the CPU scheduling policy is priority scheduling without pre-emption, the average waiting time will be

- A. 12.8 ms      B. 11.8 ms      C. 10.8 ms      D. 09.8 ms

**Answer key****29.18.10 Process Scheduling: ISRO2011-4**

The following table shows the processes in the ready queue and time required for each process for completing its job.

**Process Time**

$P_1$	10
$P_2$	5
$P_3$	20
$P_4$	8
$P_5$	15

If round-robin scheduling with 5 ms is used what is the average waiting time of the processes in the queue?

- A. 27 ms      B. 26.2 ms      C. 27.5 ms      D. 27.2 ms

[Answer key](#)

#### 29.18.11 Process Scheduling: ISRO2014-78 [top](#)



Which of the following is not an optimization criterion in the design of a CPU scheduling algorithm?

- A. Minimum CPU utilization
- B. Maximum throughput
- C. Minimum turnaround time
- D. Minimum waiting time

isro2014 operating-system process-scheduling

[Answer key](#)

#### 29.18.12 Process Scheduling: ISRO2015-33 [top](#)



Suppose a system contains  $n$  processes and system uses the round-robin algorithm for CPU scheduling then which data structure is best suited ready queue of the process

- A. stack
- B. queue
- C. circular queue
- D. tree

isro2015 operating-system process-scheduling

[Answer key](#)

#### 29.18.13 Process Scheduling: ISRO2015-38 [top](#)



Suppose two jobs, each of which needs 10 minutes of CPU time, start simultaneously. Assume 50% I/O wait time. How long will it take for both to complete, if they run sequentially?

- A. 10
- B. 20
- C. 30
- D. 40

process-scheduling isro2015

[Answer key](#)

#### 29.18.14 Process Scheduling: ISRO2016-51 [top](#)



For the real time operating system, which of the following is the most suitable scheduling scheme?

- A. Round robin
- B. First come first serve
- C. Pre-emptive
- D. Random scheduling

isro2016 operating-system process-scheduling

[Answer key](#)

#### 29.18.15 Process Scheduling: ISRO2020-27 [top](#)



Which of the following algorithms defines time quantum?

- A. shortest job scheduling algorithm
- B. round robin scheduling algorithm
- C. priority scheduling algorithm
- D. multilevel queue scheduling algorithm

isro-2020 operating-system process-scheduling easy

[Answer key](#)

### 29.18.16 Process Scheduling: ISRO2020-31 [top](#)



Three CPU-bound tasks, with execution times of 15, 12 and 5 time units respectively arrive at times 0,  $t$  and 8, respectively. If the operating system implements a shortest remaining time first scheduling algorithm, what should be the value of  $t$  to have 4 context switches? Ignore the context switches at time 0 and at the end.

- A.  $0 < t < 3$
- B.  $t = 0$
- C.  $t \leq 3$
- D.  $3 < t < 8$

isro-2020 operating-system process-scheduling normal

[Answer key](#)

## 29.19

### Process Synchronization (6) [top](#)



#### 29.19.1 Process Synchronization: GATE CSE 1996 | Question: 1.19, ISRO2008-61 [top](#)

A critical section is a program segment

- A. which should run in a certain amount of time
- B. which avoids deadlocks
- C. where shared resources are accessed
- D. which must be enclosed by a pair of semaphore operations,  $P$  and  $V$

gate1996 operating-system process-synchronization easy isro2008

[Answer key](#)



#### 29.19.2 Process Synchronization: ISRO2007-42, UGCNET-June2010-II: 37 [top](#)

Semaphores

- A. synchronize critical resources to prevent deadlock
- B. synchronize critical resources to prevent contention
- C. are used to do I/O
- D. are used for memory management

isro2007 operating-system process-synchronization ugcnetcse-june2010-paper2

[Answer key](#)



#### 29.19.3 Process Synchronization: ISRO2017-56 [top](#)

Mutual exclusion problem occurs

- A. between two disjoint processes that do not interact
- B. among processes that share resources
- C. among processes that do not use the same resource
- D. between two processes that uses different resources of different machine

isro2017 operating-system process-synchronization

[Answer key](#)

#### 29.19.4 Process Synchronization: ISRO2018-67 [top](#)



Procedures  $P_1$  and  $P_2$  have a producer-consumer relationship, communicating by the use of a set of shared buffers.

$P_1$ : repeat

- Obtain an empty buffer
- Fill it
- Return a full buffer

forever

$P_2$ : repeat

- Obtain a full buffer
- Empty it
- Return an empty buffer

forever

Increasing the number of buffers is likely to do which of the following?

- I. Increase the rate at which requests are satisfied (throughput)
  - II. Decrease the likelihood of deadlock
  - III. Increase the ease of achieving a correct implementation
- a. III only      b. II only      c. I only      d. II and III only

isro2018 process-synchronization operating-system

[Answer key](#)

#### 29.19.5 Process Synchronization: ISRO2020-26 [top](#)



The operating system and the other processes are protected from being modified by an already running process because

- A. they run at different time instants and not in parallel
- B. they are in different logical addresses
- C. they use a protection algorithm in the scheduler
- D. every address generated by the CPU is being checked against the relocation and limit parameters

isro-2020 operating-system process-synchronization easy

[Answer key](#)

#### 29.19.6 Process Synchronization: ISRO2020-28 [top](#)



Dispatch latency is defined as

- A. the speed of dispatching a process from running to the ready state
- B. the time of dispatching a process from running to ready state and keeping the CPU idle
- C. the time to stop one process and start running another one

D. none of these

isro-2020 operating-system process-synchronization easy

Answer key 

29.20

Realtime Systems (1) 

29.20.1 Realtime Systems: ISRO2017-73 



Which of the following statement is true?

- A. Hard real time OS has less jitter than soft real time OS
- B. Hard real time OS has more jitter than soft real time OS
- C. Hard real time OS has equal jitter as soft real time OS
- D. None of the above

isro2017 operating-system realtime-systems

Answer key 

29.21

Resource Allocation (9) 

29.21.1 Resource Allocation: ISRO2007-40 



Consider a system having ' $m$ ' resources of the same type. The resources are shared by 3 processes A, B, C, which have peak time demands of 3, 4, 6 respectively. The minimum value of ' $m$ ' that ensures that deadlock will never occur is

- A. 11
- B. 12
- C. 13
- D. 14

isro2007 operating-system resource-allocation

Answer key 

29.21.2 Resource Allocation: ISRO2008-62 



In which of the following four necessary conditions for deadlock processes claim exclusive control of the resources they require?

- A. no preemption
- B. mutual exclusion
- C. circular wait
- D. hold and wait

isro2008 operating-system resource-allocation deadlock-prevention-avoidance-detection

Answer key 

29.21.3 Resource Allocation: ISRO2009-16 



Consider a system having " $n$ " resources of same type. These resources are shared by 3 processes, A, B, C. These have peak demands of 3, 4, and 6 respectively. For what value of " $n$ " deadlock won't occur

- A. 15
- B. 9
- C. 10
- D. 13

isro2009 operating-system resource-allocation deadlock-prevention-avoidance-detection

[Answer key](#)

#### 29.21.4 Resource Allocation: ISRO2011-60 [top](#)



A total of 9 units of a resource type available, and given the safe state shown below, which of the following sequence will be a safe state?

**Process Used Max**

$P_1$	2	7
$P_2$	1	6
$P_3$	2	5
$P_4$	1	4

- A.  $\langle P_4, P_1, P_3, P_2 \rangle$   
C.  $\langle P_4, P_2, P_3, P_1 \rangle$   
B.  $\langle P_4, P_2, P_1, P_3 \rangle$   
D.  $\langle P_3, P_1, P_2, P_4 \rangle$

isro2011 operating-system resource-allocation

[Answer key](#)

#### 29.21.5 Resource Allocation: ISRO2014-68 [top](#)



What is the minimum number of resources required to ensure that deadlock will never occur, if there are currently three processes  $P_1, P_2$  and  $P_3$  running in a system whose maximum demand for the resources of same type are 3, 4, and 5 respectively.

- A. 3      B. 7      C. 9      D. 10

isro2014 operating-system resource-allocation

[Answer key](#)

#### 29.21.6 Resource Allocation: ISRO2015-32 [top](#)



In a lottery scheduler with 40 tickets, how we will distribute the tickets among 4 processes  $P_1, P_2, P_3$  and  $P_4$  such that each process gets 10%, 5%, 60% and 25% respectively?

	$P_1$	$P_2$	$P_3$	$P_4$
A	12	4	70	30
B	7	5	20	10
C	4	2	24	10
D	8	5	30	40

isro2015 operating-system resource-allocation

[Answer key](#)

#### 29.21.7 Resource Allocation: ISRO2016-46 [top](#)



With single resource, deadlock occurs

- A. if there are more than two processes competing for that resources  
B. if there are only two processes competing for that resources  
C. if there is a single process competing for that resources  
D. none of these

**Answer key****29.21.8 Resource Allocation: ISRO2016-47**

A system has 3 processes sharing 4 resources. If each process needs a maximum of 2 units, then

- A. Deadlock can never occur
- B. Deadlock may occur
- C. Deadlock has to occur
- D. None of these

**Answer key****29.21.9 Resource Allocation: ISRO2017-48**

What problem is solved by Dijkstra banker' algorithm?

- A. Mutual exclusion
- B. Deadlock recovery
- C. Deadlock avoidance
- D. Cache coherence

**Answer key****29.22****Segmentation (2)****29.22.1 Segmentation: ISRO2014-18**

Consider the following segment table in segmentation scheme :

<b>Segment ID</b>	<b>Base</b>	<b>Limit</b>
0	200	200
1	5000	1210
2	1527	498
3	2500	50

What happens if the logical address requested is – Segment Id 2 and offset 1000?

- A. Fetches the entry at the physical address 2527 for segment Id 2
- B. A trap is generated
- C. Deadlock
- D. Fetches the entry at offset 27 in Segment Id 3

**Answer key****29.22.2 Segmentation: ISRO2015-31**

If there are 32 segments, each size 1 k bytes, then the logical address should have

- A. 13 bits
- B. 14 bits
- C. 15 bits
- D. 16 bits

**Answer key****29.23****Semaphore (4)****29.23.1 Semaphore: GATE CSE 1992 | Question: 02,x, ISRO2015-35**

At a particular time of computation, the value of a counting semaphore is 7. Then 20  $P$  operations and 15  $V$  operations were completed on this semaphore. The resulting value of the semaphore is :

- A. 42      B. 2      C. 7      D. 12

**Answer key****29.23.2 Semaphore: ISRO2015-30**

Semaphores are used to solve the problem of

- I. Race Condition
- II. Process Synchronization
- III. Mutual Exclusion
- IV. None of the above

- A. I and II      B. II and III      C. All of the above      D. None of the above

**Answer key****29.23.3 Semaphore: ISRO2016-45**

At a particular time of computation the value of a counting semaphore is 7. Then 20  $P$  operations and  $x V$  operations were completed on this semaphore. If the new value of semaphore is 5,  $x$  will be

- A. 18      B. 22      C. 15      D. 13

**Answer key****29.23.4 Semaphore: ISRO2017-71**

At a particular time the value of counting semaphore is 10. It will become 7 after:

- |  |  |
|--|--|
| A. 3 $V$ operations                      | B. 3 $P$ operations                      |
| C. 5 $V$ operations and 2 $P$ operations | D. 2 $V$ operations and 5 $P$ operations |

**Answer key****29.24****Unix (1)**

## 29.24.1 Unix: ISRO2017-72 [top](#)



The Linux command mknod myfifo b 4 16

- A. will create a character device if user is root
- B. will create a named pipe FIFO if user is root
- C. will create a block device if user is root
- D. None of these

isro2017 operating-system unix non-gate

[Answer key](#)

## 29.25

## Virtual Memory (6) [top](#)



### 29.25.1 Virtual Memory: GATE CSE 2006 | Question: 62, ISRO2016-50 [top](#)

A CPU generates 32-bit virtual addresses. The page size is 4 KB. The processor has a translation look-aside buffer (TLB) which can hold a total of 128 page table entries and is 4-way set associative. The minimum size of the TLB tag is:

- A. 11 bits
- B. 13 bits
- C. 15 bits
- D. 20 bits

gatecse-2006 operating-system virtual-memory normal isro2016

[Answer key](#)

### 29.25.2 Virtual Memory: ISRO2007-27 [top](#)



Virtual memory is

- A. Part of Main Memory only used for swapping
- B. A technique to allow a program, of size more than the size of main memory, to run
- C. Part of secondary storage used in program execution
- D. None of these

isro2007 operating-system virtual-memory

[Answer key](#)

### 29.25.3 Virtual Memory: ISRO2008-65 [top](#)



Consider a logical address space of 8 pages of 1024 words mapped into memory of 32 frames. How many bits are there in the logical address?

- A. 13 bits
- B. 15 bits
- C. 14 bits
- D. 12 bits

isro2008 operating-system virtual-memory

[Answer key](#)

### 29.25.4 Virtual Memory: ISRO2009-11 [top](#)



A page fault

- A. Occurs when a program accesses an available page on memory
- B. is an error in a specific page
- C. is a reference to a page belonging to another program

- D. occurs when a program accesses a page not currently in memory

isro2009 operating-system virtual-memory

[Answer key](#)

#### 29.25.5 Virtual Memory: ISRO2011-49 [top](#)



Consider a 32-bit machine where four-level paging scheme is used. If the hit ratio to TLB is 98%, and it takes 20 nanosecond to search the TLB and 100 nanoseconds to access the main memory what is effective memory access time in nanoseconds?

- A. 126      B. 128      C. 122      D. 120

isro2011 operating-system virtual-memory

[Answer key](#)

#### 29.25.6 Virtual Memory: ISRO2013-55 [top](#)



Consider a logical address space of 8 pages of 1024 words each, mapped onto a physical memory of 32 frames. How many bits are there in the physical address and logical address respectively?

- A. 5,3      B. 10,10      C. 15,13      D. 15,15

isro2013 operating-system virtual-memory

[Answer key](#)

### 29.26

#### Working Set (1) [top](#)



#### 29.26.1 Working Set: ISRO2016-49 [top](#)

Working Set ( $t, k$ ) at an instant of time  $t$  is

- A. the set of  $k$  future references that the OS will make
- B. the set of future references that the OS will make in next  $t$  unit of time
- C. the set of  $k$  references with high frequency
- D. the  $k$  set of pages that have been referenced in the last  $t$  time units

operating-system working-set isro2016

[Answer key](#)

## Answer Keys

29.0.1	D	29.0.2	A	29.0.3	D	29.0.4	D	29.0.5	C
29.0.6	A	29.0.7	B	29.0.8	B	29.0.9	B	29.0.10	C
29.0.11	B	29.0.12	C	29.0.13	B	29.1.1	A	29.2.1	B
29.2.2	B	29.3.1	A	29.4.1	A	29.4.2	A	29.5.1	D





## 30.1

Programming In C (2) [top ↴](#)30.1.1 Programming In C: ISRO2018-18 [top ↴](#)

Consider the following C code segment:

```
#include <stdio.h>
main()
{
    int i, j, x;
    scanf("%d", &x);
    i=1; j=1;
    while (i<10) {
        j = j*i;
        i = i+1;
        if(i==x) break;
    }
}
```

For the program fragment above, which of the following statements about the variables i and j must be true after execution of this program? [ !(exclamation) sign denotes factorial in the answer]

- a.  $(j = (x - 1)!) \wedge (i \geq x)$
- b.  $(j = 9!) \wedge (j = 10)$
- c.  $((j = 10!) \wedge (i = 10)) \vee ((j = (x - 1)!) \wedge (i = x))$
- d.  $(j = 9!) \wedge (i \geq 10) \vee ((j = (x - 1)!) \wedge (i = x))$

isro2018 programming-in-c programming

[Answer key ↗](#)

30.1.2 Programming In C: ISRO2018-70 [top ↴](#)

Consider the following C program:

```
main()
{
float sum= 0.0, j=1.0,i=2.0;
while(i/j>0.001){
    j=j+1;
    sum=sum+i/j;
    printf("%f\n", sum);
}
}
```

- A. 0 - 9 lines of output
- B. 10 - 19 lines of output
- C. 20 - 29 lines of output
- D. More than 29 lines of output

isro2018 programming-in-c programming

[Answer key ↗](#)

## Answer Keys

30.1.1

D

30.1.2

D



## 31.1

Array (1) top ↗31.1.1 Array: ISRO2020-18 top ↗

Consider a 2-dimensional array  $x$  with 10 rows and 4 columns, with each element storing a value equivalent to the product of row number and column number. The array is stored in row-major format. If the first element  $x[0][0]$  occupies the memory location with address 1000 and each element occupies only one memory location, which all locations (in decimal) will be holding a value of 10?

- a. 1018,1019
- b. 1022,1041
- c. 1013,1014
- d. 1000,1399

isro-2020 data-structures array normal

Answer key

## 31.2

Avl Tree (1) top ↗31.2.1 Avl Tree: ISRO2020-20 top ↗

The minimum height of an AVL tree with  $n$  nodes is

- |                            |                    |
|----------------------------|--------------------|
| A. Ceil $(\log_2(n + 1))$  | B. $1.44 \log_2 n$ |
| C. Floor $(\log_2(n + 1))$ | D. $1.64 \log_2 n$ |

isro-2020 data-structures avl-tree normal

Answer key

## 31.3

Binary Search Tree (5) top ↗31.3.1 Binary Search Tree: GATE CSE 2003 | Question: 19, ISRO2009-24 top ↗

Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree?

- A. 7 5 1 0 3 2 4 6 8 9
- B. 0 2 4 3 1 6 5 9 8 7
- C. 0 1 2 3 4 5 6 7 8 9
- D. 9 8 6 4 2 3 0 1 5 7

gatecse-2003 binary-search-tree easy isro2009

Answer key

31.3.2 Binary Search Tree: GATE CSE 2003 | Question: 63, ISRO2009-25 top ↗

A data structure is required for storing a set of integers such that each of the following operations can be done in  $O(\log n)$  time, where  $n$  is the number of elements in the set.

- I. Deletion of the smallest element
- II. Insertion of an element if it is not already present in the set

Which of the following data structures can be used for this purpose?

- A. A heap can be used but not a balanced binary search tree
- B. A balanced binary search tree can be used but not a heap
- C. Both balanced binary search tree and heap can be used
- D. Neither balanced search tree nor heap can be used

gatecse-2003 data-structures easy isro2009 binary-search-tree

[Answer key](#)

### 31.3.3 Binary Search Tree: GATE CSE 2004 | Question: 4, ISRO2009-26 [top](#)



The following numbers are inserted into an empty binary search tree in the given order: 10, 1, 3, 5, 15, 12, 16. What is the height of the binary search tree (the height is the maximum distance of a leaf node from the root)?

- A. 2
- B. 3
- C. 4
- D. 6

gatecse-2004 data-structures binary-search-tree easy isro2009

[Answer key](#)

### 31.3.4 Binary Search Tree: ISRO2011-62 [top](#)



The average depth of a binary search tree is

$$O(n^{0.5})$$

$$O(n)$$

$$O(\log n)$$

$$O(n \log n)$$

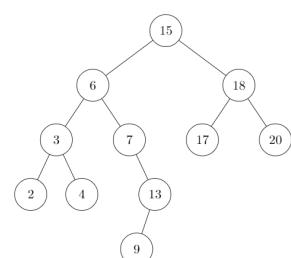
isro2011 data-structures binary-search-tree

[Answer key](#)

### 31.3.5 Binary Search Tree: ISRO2020-19 [top](#)



What is the in-order successor of 15 in the given binary search tree?



- A. 18      B. 6      C. 17      D. 20

isro-2020    data-structures    binary-search-tree    easy

Answer key 

31.4

Binary Tree (6) 

### 31.4.1 Binary Tree: ISRO2008-75



A complete binary tree with the property that the value at each node is at least as large as the values at its children is known as

- A. binary search tree      B. AVL tree  
C. completely balanced tree      D. Heap

isro2008    data-structures    binary-tree

Answer key 

### 31.4.2 Binary Tree: ISRO2009-31



A full binary tree with  $n$  leaves contains

- A.  $n$  nodes      B.  $\log_2 n$  nodes      C.  $2n - 1$       D.  $2^n$  nodes

isro2009    data-structures    binary-tree

Answer key 

### 31.4.3 Binary Tree: ISRO2011-26



The in-order traversal of a tree resulted in FBGADCE. Then the pre-order traversal of that tree would result in

- A. FGBDECA      B. ABFGCDE      C. BFGCDEA      D. AFGBDEC

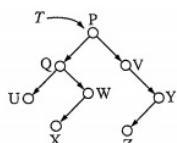
isro2011    data-structures    binary-tree

Answer key 

### 31.4.4 Binary Tree: ISRO2014-41



Consider the following binary search tree T given below: Which node contains the fourth smallest element in T?



- A. Q      B. V      C. W      D. X

isro2014    data-structures    binary-tree

Answer key 

### 31.4.5 Binary Tree: ISRO2016-30 [top](#)



A complete binary tree with  $n$  non-leaf nodes contains

- A.  $\log_2 n$  nodes
- B.  $n + 1$  nodes
- C.  $2n$  nodes
- D.  $2n + 1$  nodes

data-structures binary-tree isro2016

[Answer key](#)

### 31.4.6 Binary Tree: ISRO2020-23 [top](#)



The post-order traversal of binary tree is *ACEDBHIGF*. The pre-order traversal is

- A. A B C D E F G H I
- B. F B A D C E G I H
- C. F A B C D E G H I
- D. A B D C E F G I H

isro-2020 data-structures binary-tree normal

[Answer key](#)

## 31.5

### Breadth First Search (1) [top](#)



#### 31.5.1 Breadth First Search: ISRO2020-32 [top](#)

$G$  is an undirected graph with vertex set  $\{v1, v2, v3, v4, v5, v6, v7\}$  and edge set  $\{v1v2, v1v3, v1v4, v2v4, v2v5, v3v4, v4v5, v4v6, v5v6, v6v7\}$ . A breadth first search of the graph is performed with  $v1$  as the root node. Which of the following is a tree edge?

- A.  $v2v4$
- B.  $v1v4$
- C.  $v4v5$
- D.  $v3v4$

isro-2020 data-structures breadth-first-search normal

[Answer key](#)

## 31.6

### Data Structures (2) [top](#)



#### 31.6.1 Data Structures: ISRO2011-70 [top](#)

Number of comparisons required for an unsuccessful search of an element in a sequential search organized, fixed length, symbol table of length L is

- A. L
- B.  $L/2$
- C.  $(L+1)/2$
- D.  $2L$

isro2011 data-structures

[Answer key](#)



#### 31.6.2 Data Structures: ISRO2017-59 [top](#)

The best data structure to check whether an arithmetic expression has balanced parenthesis is a:

- A. Queue
- B. Stack
- C. Tree
- D. List

isro2017 data-structures

[Answer key](#)

**31.7****Hashing (4)** [top](#)**31.7.1 Hashing: GATE CSE 1989 | Question: 1-vii, ISRO2015-14 [top](#)**

A hash table with ten buckets with one slot per bucket is shown in the following figure. The symbols  $S1$  to  $S7$  initially entered using a hashing function with linear probing. The maximum number of comparisons needed in searching an item that is not present is

0	S7
1	S1
2	
3	S4
4	S2
5	
6	S5
7	
8	S6
9	S3

- A. 4      B. 5      C. 6      D. 3

hashing    isro2015    gate1989    algorithms    normal

**Answer key** **31.7.2 Hashing: ISRO2014-64** [top](#)

Consider a 13 element hash table for which  $f(key) = \text{key mod } 13$  is used with integer keys. Assuming linear probing is used for collision resolution, at which location would the key 103 be inserted, if the keys 661, 182, 24 and 103 are inserted in that order?

- A. 0      B. 1      C. 11      D. 12

isro2014    hashing

**Answer key** **31.7.3 Hashing: ISRO2016-29** [top](#)

A Hash Function  $f$  defined as  $f(\text{key}) = \text{key mod } 7$ . With linear probing while inserting the keys 37, 38, 72, 48, 98, 11, 56 into a table indexed from 0, in which location key 11 will be stored (Count table index 0 as  $0^{\text{th}}$  location)?

- A. 3      B. 4      C. 5      D. 6

data-structures    hashing    isro2016

**Answer key** **31.7.4 Hashing: ISRO2020-24** [top](#)

In linear hashing, if blocking factor  $bfr$ , loading factor  $i$  and file buckets  $N$  are known, the number of records will be

- A.  $cr = i + bfr + N$       B.  $r = i - bfr - N$

C.  $r = i + bfr - N$

D.  $r = i^* bfr^* N$

isro-2020 data-structures hashing normal

Answer key 

## 31.8

### Infix Prefix (2) [top](#)

#### 31.8.1 Infix Prefix: ISRO2017-69 [top](#)

Choose the equivalent prefix form of the following expression

$$(a+(b-c))^*((d-e)/(f+g-h))$$

- A. \*+a-bc/-de-+fgb B. \*+a-bc-/de-+fgb C. \*+a-bc/-ed-+fgb D. \*+ab-c/-de-+fgb

isro2017 data-structures infix-prefix stack

Answer key 

#### 31.8.2 Infix Prefix: ISRO2020-4 [top](#)

Convert the pre-fix expression to in-fix  $-^* + ABC^* - DE + FG$

- A.  $(A - B)^*C + (D^*E) - (F + G)$  B.  $(A + B)^*C - (D - E)^*(F - G)$   
C.  $(A + B - C)^*(D - E)^*(F + G)$  D.  $(A + B)^*C - (D^*E) - (F + G)$

isro-2020 data-structures infix-prefix normal

Answer key 

## 31.9

### Linked List (6) [top](#)

#### 31.9.1 Linked List: ISRO2008-71 [top](#)

The time required to search an element in a linked list of length n is

- A.  $O(\log_2 n)$  B.  $O(n)$  C.  $O(1)$  D.  $O(n^2)$

isro2008 data-structures linked-list

Answer key 

#### 31.9.2 Linked List: ISRO2008-72 [top](#)

Which of the following operations is performed more efficiently by doubly linked list than by linear linked list?

- A. Deleting a node whose location is given  
B. Searching an unsorted list for a given item  
C. Inserting a node after the node with a given location  
D. Traversing the list to process each node

isro2008 data-structures linked-list

Answer key 

### 31.9.3 Linked List: ISRO2008-76 [top](#)



The minimum number of fields with each node of doubly linked list is

- A. 1
- B. 2
- C. 3
- D. 4

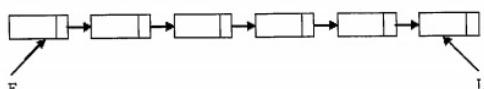
isro2008 data-structures linked-list

[Answer key](#)

### 31.9.4 Linked List: ISRO2014-49 [top](#)



Consider a single linked list where  $F$  and  $L$  are pointers to the first and last elements respectively of the linked list. The time for performing which of the given operations depends on the length of the linked list?



- A. Delete the first element of the list
- B. Interchange the first two elements of the list
- C. Delete the last element of the list
- D. Add an element at the end of the list

isro2014 data-structures linked-list

[Answer key](#)

### 31.9.5 Linked List: ISRO2017-16 [top](#)



Given two statements

- I. Insertion of an element should be done at the last node of the circular list
  - II. Deletion of an element should be done at the last node of the circular list
- 
- A. Both are true
  - B. Both are false
  - C. First is false and second is true
  - D. None of the above

isro2017 data-structures linked-list bad-question

[Answer key](#)

### 31.9.6 Linked List: ISRO2017-53 [top](#)



In a doubly linked list the number of pointers affected for an insertion operation will be

- A. 4
- B. 0
- C. 1
- D. Depends on the nodes of doubly linked list

isro2017 data-structures linked-list bad-question

[Answer key](#)

## 31.10

### Queue (1) [top](#)

### 31.10.1 Queue: ISRO2014-36 [top](#)



Consider a standard Circular Queue implementation (which has the same condition for Queue Full and Queue Empty) whose size is 11 and the elements of the queue are  $q[0], q[1], \dots, q[10]$ .

The front and rear pointers are initialized to point at  $q[2]$ . In which position will the ninth element be added?

- A.  $q[0]$
- B.  $q[1]$
- C.  $q[9]$
- D.  $q[10]$

data-structures    queue    isro2014

[Answer key](#)

### 31.11 Stack (7) [top](#)

#### Stack (7) [top](#)



### 31.11.1 Stack: GATE CSE 2004 | Question: 38, ISRO2009-27 [top](#)

Assume that the operators  $+, -, \times$  are left associative and  $^$  is right associative. The order of precedence (from highest to lowest) is  $^, \times, +, -$ . The postfix expression corresponding to the infix expression  $a + b \times c - d ^ e ^ f$  is

- A.  $abc \times +def ^ ^-$
- B.  $abc \times +de ^ f ^ -$
- C.  $ab + c \times d - e ^ f ^$
- D.  $- + a \times bc ^ ^ def$

gatecse-2004    stack    isro2009

[Answer key](#)

### 31.11.2 Stack: GATE CSE 2007 | Question: 38, ISRO2016-27 [top](#)



The following postfix expression with single digit operands is evaluated using a stack:

$$8\ 2\ 3\ ^\ / \ 2\ 3\ *\ +\ 5\ 1\ *\ -$$

Note that  $^$  is the exponentiation operator. The top two elements of the stack after the first  $*$  is evaluated are

- A. 6,1
- B. 5,7
- C. 3,2
- D. 1,5

gatecse-2007    data-structures    stack    normal    isro2016

[Answer key](#)



### 31.11.3 Stack: ISRO2007-16, ISRO2009-30, ISRO2014-43 [top](#)

The five items: A, B, C, D, and E are pushed in a stack, one after other starting from A. The stack is popped four items and each element is inserted in a queue. The two elements are deleted from the queue and pushed back on the stack. Now one item is popped from the stack. The popped item is

A. A

B. B

C. C

D. D

isro2007 stack isro2009 isro2014

Answer key 

#### 31.11.4 Stack: ISRO2008-70



Stack A has the entries a, b, c (with a on top). Stack B is empty. An entry popped out of stack A can be printed immediately or pushed to stack B. An entry popped out of the stack B can be only be printed. In this arrangement, which of the following permutations of a, b, c are not possible?

A. b a c

B. b c a

C. c a b

D. a b c

isro2008 data-structures stack

Answer key 

#### 31.11.5 Stack: ISRO2015-11



If the sequence of operations - push (1), push (2), pop, push (1), push (2), pop, pop, pop, push (2), pop are performed on a stack, the sequence of popped out values

A. 2,2,1,1,2

B. 2,2,1,2,2

C. 2,1,2,2,1

D. 2,1,2,2,2

isro2015 data-structures stack

Answer key 

#### 31.11.6 Stack: ISRO2015-15



The queue data structure is to be realized by using stack. The number of stacks needed would be

A. It cannot be implemented

B. 2 stacks

C. 4 stacks

D. 1 stack

isro2015 data-structures stack

Answer key 

#### 31.11.7 Stack: ISRO2020-72



A stack is implemented with an array of ' $A[0...N - 1]$ ' and a variable ' $pos$ '. The push and pop operations are defined by the following code.

```
push (x)
  A[pos] <- x
  pos <- pos + 1
end push
pop()
  pos <- pos - 1
  return A[pos]
end pop
```

Which of the following will initialize an empty stack with capacity  $N$  for the above implementation

A.  $pos \leftarrow -1$

B.  $pos \leftarrow 0$

C.  $pos \leftarrow 1$

D.  $pos \leftarrow N - 1$

**Answer key****31.12****Symbol Table (1)** top**31.12.1 Symbol Table: ISRO2016-39** top

Access time of the symbolic table will be logarithmic if it is implemented by

- A. Linear list
- B. Search tree
- C. Hash table
- D. Self organization list

**Answer key****31.13****Tree (2)** top**31.13.1 Tree: ISRO2011-19** top

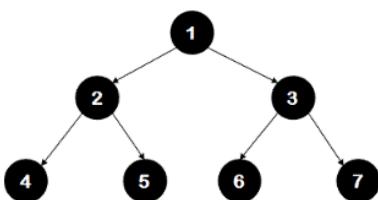
If node A has three siblings and B is parent of A, what is the degree of A?

- A. 0
- B. 3
- C. 4
- D. 5

**Answer key****31.13.2 Tree: ISRO2020-71** top

Of the following, which best approximates the ratio of the number of nonterminal nodes in the total number of nodes in a complete  $K$ -ary tree of depth  $N$ ?

- A.  $1/N$
- B.  $N - 1/N$
- C.  $1/K$
- D.  $K - 1/K$

**Answer key****31.14****Tree Traversal (1)** top**31.14.1 Tree Traversal: ISRO2017-50** top

If the post order traversal gives ab -cd \* + then the label of the nodes 1,2,3.. will be

- A. + , -, \*, a,b,c,d
- B. a, -,b,+,c,\* ,d
- C. a,b,c,d,-,\* ,+
- D. -,a,b,+,\*,c,d

**Answer key**

## Answer Keys

31.1.1	X	31.2.1	C	31.3.1	C	31.3.2	B	31.3.3	B
31.3.4	C	31.3.5	C	31.4.1	D	31.4.2	C	31.4.3	B
31.4.4	C	31.4.5	D	31.4.6	B	31.5.1	B	31.6.1	A
31.6.2	B	31.7.1	B	31.7.2	B	31.7.3	C	31.7.4	D
31.8.1	A	31.8.2	X	31.9.1	B	31.9.2	A	31.9.3	C
31.9.4	C	31.9.5	B	31.9.6	X	31.10.1	A	31.11.1	A
31.11.2	A	31.11.3	D	31.11.4	C	31.11.5	A	31.11.6	B
31.11.7	D	31.12.1	B	31.13.1	X	31.13.2	C	31.14.1	A

32.0.1 ISRO2018-1 [top](#)

Consider the following program

```
{
    int x=1;
    printf("%d",(*char(char*)&x));
}
```

Assuming required header files are included and if the machine in which this program is executed is little endian, then the output will be

- A. 0      B. 99999999      C. 1      D. unpredictable

isro2018 programming

[Answer key](#)

32.0.2 ISRO2020-74 [top](#)

Following declaration of an array of struct, assumes size of byte, short, int and long are 1, 2, 3 and 4 respectively. Alignment rule stipulates that  $n$  – byte field must be located at an address divisible by  $n$ , the fields in the struct are not rearranged, padding is used to ensure alignment. All elements of array should be of same size.

```
Struct complx
    Short s
    Byte b
    Long l
    Int i
End Complx
Complx C[10]
```

Assuming  $C$  is located at an address divisible by 8, what is the total size of  $C$ , in bytes?

- A. 150      B. 160      C. 200      D. 240

isro-2020 programming normal

[Answer key](#)

32.0.3 ISRO2018-60 [top](#)

What is the output of the following program?

```
main(){
    int x=2, y=5;
    if(x<y) return (x=x+y);
    else printf("z1");
    printf("z2");
}
```

- a. z2      b. z1z2      c. Compilation error. None of these

isro2018 programming

[Answer key](#)

### 32.0.4 ISRO2018-2 [top](#)



Consider the following declaration :

```
structaddr {  
    char city[10];  
    char street[30];  
    int pin;  
};  
struct {  
    char name[30];  
    int gender;  
    struct addr locate;  
} person, *kd = &person;
```

Then  $*(kd - > name + 2)$  can be used instead of:

- A.  $person.name + 2$
- B.  $kd - > (name + 2)$
- C.  $*((*kd).name + 2)$
- D. either A) or B) , not C)

isro2018 programming

[Answer key](#)

### 32.0.5 ISRO2020-59 [top](#)



Consider the following recursive C function that takes two arguments

```
unsigned int rer(unsigned int n, unsigned int r){  
    if(n>0) return(n%r + rer(n/r,r));  
    else return 0;  
}
```

What is the return value of the function *rer* when it is called as *rer(513, 2)*?

- A. 9
- B. 8
- C. 5
- D. 2

isro-2020 programming normal

[Answer key](#)

### 32.0.6 ISRO2014-39 [top](#)



If only one memory location is to be reserved for a class variable, no matter how many objects are instantiated, then the variable should be declared as

- A. extern
- B. static
- C. volatile
- D. const

programming isro2014

[Answer key](#)

### 32.0.7 ISRO2014-13 [top](#)



Which of the following is true with respect to Reference?

- A. A reference can never be NULL
- B. A reference needs an explicit dereferencing mechanism
- C. A reference can be reassigned after it is established

D. A reference and pointer are synonymous

programming isro2014

Answer key 

32.1

Activation Record (1) [top](#) 

32.1.1 Activation Record: ISRO2014-51 [top](#) 

Which of the following is NOT represented in a subroutine's activation record frame for a stack-based programming language?

- A. Values of local variables
- B. Return address
- C. Heap area
- D. Information needed to access non local variables

isro2014 programming activation-record

Answer key 

32.2

Array (3) [top](#) 

32.2.1 Array: ISRO2008-1 [top](#) 

Which of the following is an illegal array definition?

- A. Type COLONGE : (LIME, PINE, MUSK, MENTHOL); var a : array [COLONGE] of REAL;
- B. var a : array [REAL] of REAL;
- C. var a : array ['A'...'Z'] of REAL;
- D. var a : array [BOOLEAN] of REAL;

isro2008 array

Answer key 

32.2.2 Array: ISRO2009-29 [top](#) 

A one dimensional array A has indices 1....75. Each element is a string and takes up three memory words. The array is stored at location 1120 decimal. The starting address of A[49] is

- A. 1267
- B. 1164
- C. 1264
- D. 1169

isro2009 array programming

Answer key 

32.2.3 Array: ISRO2020-61 [top](#) 

What is the output of the code given below?

```
# include<stdio.h>
int main()
{
    char name[]="satellites";
    int len;
    int size;
```

```

len= strlen(name);
size = sizeof(name);
printf("%d",len*size);
return 0;
}

```

- A. 100      B. 110      C. 40      D. 44

isro-2020    programming    array    normal

[Answer key](#)

## 32.3

### Cpp (1) [top](#)

#### 32.3.1 Cpp: ISRO2018-43 [top](#)



Consider the following C++ program

```

int a (int m)
{return ++m;}
int b(int&m)
{return ++m;}
int{char &m}
{return ++m;}
void main()
{
    int p = 0, q=0, r = 0;
    p += a(b(p)) ;
    q+= b(a(q));
    r+=a(c(r));
    cout<<p<<q << r;
}

```

Assuming the required header first are already included, the above program

- |                                 |              |
|---------------------------------|--------------|
| a. results in compilation error | b. print 123 |
| c. print 111                    | d. print 322 |

isro2018    cpp    programming    non-gate

[Answer key](#)

## 32.4

### Functions (1) [top](#)

#### 32.4.1 Functions: ISRO2020-78 [top](#)



In the following procedure

```

Integer procedure P(X,Y);
Integer X,Y;
value x;
begin
    K=5;
    L=8;
    P=x+y;
end

```

$X$  is called by value and  $Y$  is called by name. If the procedure were invoked by the following program fragment

```

K=0;
L=0;
Z=P(K,L);

```

then the value of  $Z$  will be set equal to

- A. 5      B. 8      C. 13      D. 0

isro-2020   programming   functions   normal

Answer key 

32.5

Loop Invariants (1) [top](#)

### 32.5.1 Loop Invariants: ISRO2007-15 [top](#)



Consider the following pseudo-code

```
x:=1;  
i:=1;  
while (x <= 1000)  
begin  
    x:=2^x;  
    i:=i+1;  
end;
```

What is the value of  $i$  at the end of the pseudo-code?

- A. 4      B. 5      C. 6      D. 7

isro2007   loop-invariants

Answer key 

32.6

Macros (1) [top](#)

### 32.6.1 Macros: ISRO2014-3 [top](#)



What is the output of the following C program?

```
#include<stdio.h>  
#define SQR(x) (x*x)  
  
int main()  
{  
    int a;  
    int b=4;  
    a=SQR(b+2);  
    printf("%d\n",a);  
    return 0;  
}
```

- A. 14      B. 36      C. 18      D. 20

programming-in-c   macros   isro2014

Answer key 

32.7

Memory Management (2) [top](#)

### 32.7.1 Memory Management: ISRO2007-57 [top](#)



Which of the following programming language(s) provides garbage collection automatically

A. Lisp

B. C++

C. Fortan

D. C

isro2007 programming memory-management

Answer key 

### 32.7.2 Memory Management: ISRO2017-70 [top](#)

We use malloc and calloc for:

- A. Dynamic memory allocation
- C. Both dynamic memory allocation and static memory allocation

- B. Static memory allocation
- D. None of these

isro2017 programming-in-c memory-management

Answer key 

## 32.8

### Output (1) [top](#)

#### 32.8.1 Output: ISRO2018-8 [top](#)

A language with string manipulation facilities uses the following operations.

`head(s)`- returns the first character of the string  $s$

`tails( $s$ )`- returns all but the first character of the string  $s$

`concat( $s_1, s_2$ )`- concatenates string  $s_1$  with  $s_2$ .

The output of `concat(head( $s$ ), head(tail(tail( $s$ ))))`, where  $s$  is *acbc* is:

- a. ab
- b. ba
- c. ac
- d. aa

isro2018 programming output

Answer key 

## 32.9

### Parameter Passing (1) [top](#)

#### 32.9.1 Parameter Passing: GATE CSE 2006 | Question: 56, ISRO2009-58 [top](#)

Consider the following code written in a pass-by-reference language like FORTRAN and these statements about the code.

```
subroutine swap(ix,iy)
  it = ix
L1 : ix = iy
L2 : iy = it
  end
  ia = 3
  ib = 8
  call swap (ia, ib+5)
  print *, ia, ib
  end
```

**S1:** The compiler will generate code to allocate a temporary nameless cell, initialize it to 13, and pass the address of the cell to swap

**S2:** On execution the code will generate a runtime error on line L1

**S3:** On execution the code will generate a runtime error on line L2

**S4:** The program will print 13 and 8

**S5:** The program will print 13 and -2

Exactly the following set of statement(s) is correct:

- A. S1 and S2      B. S1 and S4      C. S3      D. S1 and S5

gatecse-2006   programming   parameter-passing   normal   out-of-syllabus-now   isro2009

Answer key 

**32.10**

**Pointers (3)** 

#### **32.10.1 Pointers: ISRO2015-72**



Consider the following declaration:

```
int a, *b=&a, **c=&b;
```

The following program fragment

```
a=4;   **c=5;
```

- A. does not change the value of *a*  
C. assigns the value of *b* to *a*      B. assigns address of *c* to *a*  
D. assigns 5 to *a*

pointers   programming-in-c   isro2015

Answer key 

#### **32.10.2 Pointers: ISRO2016-20**



What is the output of this C code?

```
#include<stdio.h>
void main()
{
    int k=5;
    int *p=&k;
    int **m=&p;
    printf("%d %d %d",k,*p,**m);
}
```

- A. 5 5 5      B. 5 5 junk      C. 5 junk junk      D. compile time error

programming-in-c   pointers   isro2016

Answer key 

#### **32.10.3 Pointers: ISRO2016-25**



What will be output of the following program? Assume that you are running this program in little-endian processor.

```
#include<stdio.h>
int main()
{
    short a=320;
    char *ptr;
    ptr=(char *)&a;
    printf("%d", *ptr);
    return 0;
}
```

}

- A. 1      B. 320      C. 64      D. Compilation error

programming-in-c   pointers   isro2016

Answer key 

32.11

Programming In C (22) 

### 32.11.1 Programming In C: GATE CSE 2005 | Question: 1, ISRO2017-55



What does the following C-statement declare?

int (\*f) (int \* );

- A. A function that takes an integer pointer as argument and returns an integer
- B. A function that takes an integer as argument and returns an integer pointer
- C. A pointer to a function that takes an integer pointer as argument and returns an integer
- D. A function that takes an integer pointer as argument and returns a function pointer

gatecse-2005   programming   programming-in-c   easy   isro2017

Answer key 

### 32.11.2 Programming In C: ISRO2008-43



Consider the following code segment:

```
for (int k=0; k<20; k=k+2)
{
    if (k % 3 == 1)
        system.out.print(k+ " ");
```

What is printed as a result of executing the code segment?

- A. 4 16      B. 4 10 16      C. 0 6 12 18      D. 1 4 7 10 13 16 19

isro2008   programming-in-c

Answer key 

### 32.11.3 Programming In C: ISRO2008-80



In C, what is the effect of a negative number in a field width specifier?

- A. the values are displayed right justified
- B. the values are displayed centered
- C. the values are displayed left justified
- D. the values are displayed as negative numbers

isro2008   programming   programming-in-c   non-gate

Answer key 

#### 32.11.4 Programming In C: ISRO2011-63 [top](#)



What is the output of the following C code?

```
#include <stdio.h>

int main()
{
    int index;
    for(index=1; index<=5; index++)
    {
        printf("%d", index);
        if (index==3)
            continue;
    }
}
```

- A. 1245      B. 12345      C. 12245      D. 12354

isro2011 programming-in-c

[Answer key](#)

#### 32.11.5 Programming In C: ISRO2014-32 [top](#)



What is the output of the following C program?

```
#include<stdio.h>
void main(void){
    int shifty;
    shifty=0570;
    shifty=shifty>>4;
    shifty=shifty<<6;
    printf("The value of shifty is %o \n",shifty);
}
```

- A. The value of shifty is 15c0      B. The value of shifty is 4300  
C. The value of shifty is 5700      D. The value of shifty is 2700

programming-in-c isro2014

[Answer key](#)

#### 32.11.6 Programming In C: ISRO2014-38 [top](#)



How many lines of output does the following C code produce?

```
#include<stdio.h>
float i=2.0;
float j=1.0;
float sum = 0.0;
main()
{
    while (i/j > 0.001)
    {
        j+=j;
        sum=sum+(i/j);
        printf("%f\n", sum);
    }
}
```

- A. 8      B. 9      C. 10      D. 11

isro2014 programming-in-c

[Answer key](#)

### 32.11.7 Programming In C: ISRO2014-47 [top](#)



The following three 'C' language statements is equivalent to which single statement?

```
y=y+1;  
z=x+y;  
x=x+1
```

- A.  $z = x + y + 2;$
- B.  $z = (x++) + (++y);$
- C.  $z = (x++) + (y++);$
- D.  $z = (x++) + (++y) + 1;$

isro2014 programming-in-c

[Answer key](#)

### 32.11.8 Programming In C: ISRO2015-68 [top](#)



Consider the following program fragment

```
if(a > b) if(b > c) s1; else s2;
```

s2 will be executed if

- A.  $a \leq b$
- B.  $b > c$
- C.  $b \geq c$  and  $a \leq b$
- D.  $a > b$  and  $b \leq c$

isro2015 programming programming-in-c

[Answer key](#)

### 32.11.9 Programming In C: ISRO2015-69 [top](#)



If n has 3, then the statement  $a[++n]=n++;$

- A. assigns 3 to  $a[5]$
- B. assigns 4 to  $a[5]$
- C. assigns 4 to  $a[4]$
- D. what is assigned is compiler dependent

isro2015 programming-in-c non-gate

[Answer key](#)

### 32.11.10 Programming In C: ISRO2015-70 [top](#)



The following program

```
main()  
{  
    inc(); inc(); inc();  
}  
inc()  
{  
    static int x;  
    printf("%d", ++x);  
}
```

- A. prints 012
- B. prints 123

- C. prints 3 consecutive, but unpredictable numbers      D. prints 111

isro2015 programming-in-c

Answer key 

### 32.11.11 Programming In C: ISRO2015-71 [top](#)

Consider the following program fragment

```
i=6720; j=4;  
while (i%j)==0  
{  
    i=i/j;  
    j=j+1;  
}
```

On termination j will have the value

- A. 4      B. 8      C. 9      D. 6720

isro2015 programming-in-c

Answer key 

### 32.11.12 Programming In C: ISRO2015-73 [top](#)

The output of the following program is

```
main()  
{  
    static int x[] = {1,2,3,4,5,6,7,8}  
    int i;  
    for (i=2; i<6; ++i)  
        x[x[i]]=x[i];  
    for (i=0; i<8; ++i)  
        printf("%d", x[i]);  
}
```

- A. 1 2 3 3 5 5 7 8      B. 1 2 3 4 5 6 7 8  
C. 8 7 6 5 4 3 2 1      D. 1 2 3 5 4 6 7 8

isro2015 programming-in-c

Answer key 

### 32.11.13 Programming In C: ISRO2015-74 [top](#)

Which of the following has the compilation error in C?

- A. int n = 17;  
C. float f = (float)99.32;
- B. char c = 99;  
D. #include <stdio.h>

programming-in-c isro2015

Answer key 

### 32.11.14 Programming In C: ISRO2015-75 [top](#)

The for loop

```
for (i=0; i<10; ++i)  
printf("%d", i&1);
```

prints

- A. 0101010101    B. 0111111111    C. 0000000000    D. 1111111111

isro2015    programming-in-c

Answer key 

### 32.11.15 Programming In C: ISRO2015-76 [top](#)

Consider the following statements

```
#define hypotenuse (a, b) sqrt (a*a+b*b);
```

The macro call `hypotenuse(a+2,b+3);`

- A. Finds the hypotenuse of a triangle with sides  $a + 2$  and  $b + 3$
- B. Finds the square root of  $(a + 2)^2$  and  $(b + 3)^2$
- C. Is invalid
- D. Find the square root of  $3 * a + 4 * b + 5$

programming-in-c    algorithms    isro2015

Answer key 

### 32.11.16 Programming In C: ISRO2016-79 [top](#)

Which one of the following is correct about the statements given below?

- I. All function calls are resolved at compile time in C lang
  - II. All function calls are resolved at compile time in C++ lang
- 
- A. Only II is correct
  - B. Both I and II are correct
  - C. Only I is correct
  - D. Both I and II are incorrect

isro2016    programming-in-c

Answer key 

### 32.11.17 Programming In C: ISRO2017-41 [top](#)

What is the output of the C++ program?

```
#include <iostream>
using namespace std;

void square(int *x){
    *x = (*x)++ * (*x);
}

void square(int *x, int *y){
    *x = (*x) * --(*y);
}

int main()
{
    int number = 30;
    square(&number, &number);
    cout<<number;
    return 0;
}
```

A. 910

B. 920

C. 870

D. 900

isro2017 programming-in-c

Answer key 

### 32.11.18 Programming In C: ISRO2017-62 [top](#)

What will be the output of the following C code?

```
#include <stdio.h>
main()
{
    int i;
    for(i=0;i<5;i++)
    {
        int i=10;
        printf("%d", i);
        i++;
    }
    return 0;
}
```

A. 10 11 12 13 14

C. 0 1 2 3 4

B. 10 10 10 10 10

D. Compilation error

isro2017 programming-in-c

Answer key 

### 32.11.19 Programming In C: ISRO2017-63 [top](#)

What does the following program do when the input is unsigned 16 bit integer?

```
#include<stdio.h>
main(){
    unsigned int num;
    int i;
    scanf("%u", &num);
    for(i=0;i<16;i++){
        printf("%d", (num<<i&1<<15)?1:0);
    }
}
```

A. It prints all even bits from num  
C. It prints binary equivalent of num

B. It prints all odd bits from num  
D. None of above

isro2017 programming-in-c

Answer key 

### 32.11.20 Programming In C: ISRO2017-64 [top](#)

What is the output of the following program?

```
#include<stdio.h>
int tmp=20;
main()
{
    printf("%d", tmp);
    func();
    printf("%d", tmp);
}
func()
```

```
{
static int tmp=10;
printf("%d", tmp);
}
```

- A. 20 10 10      B. 20 10 20      C. 20 20 20      D. 10 10 10

isro2017 programming-in-c

[Answer key](#)

### 32.11.21 Programming In C: ISRO2020-62 [top](#)



What is output of the following 'C' code assuming it runs on a byte addressed little endian machine?

```
#include<stdio.h>
int main()
{
    int x;
    char *ptr;
    x=622,100,101;
    printf("%d",(*char *)&x)*(x%3));
    return 0;
}
```

- A. 622      B. 311      C. 22      D. 110

isro-2020 programming programming-in-c normal

[Answer key](#)

### 32.11.22 Programming In C: ISRO2020-63 [top](#)



What is the output in a 32 bit machine with 32 bit compiler?

```
#include<stdio.h>
rer(int **ptr2, int **ptr1)
{
    int *ii;
    ii=*ptr2;
    *ptr2=*ptr1;
    *ptr1=ii;
    **ptr1**ptr2;
    **ptr2+=**ptr1;
}
void main(){
    int var1=5, var2=10;
    int *ptr1=&var1,*ptr2=&var2;
    rer(&ptr1,&ptr2);
    printf("%d %d",var2,var1);
}
```

- A. 60,70      B. 50,50      C. 50,60      D. 60,50

isro-2020 programming programming-in-c normal

[Answer key](#)

## 32.12

## Recursion (2) [top](#)

### 32.12.1 Recursion: GATE CSE 2004 | Question: 31, ISRO2008-40 [top](#)



Consider the following C function:

```
int f(int n)
{
    static int i = 1;
    if(n >= 5) return n;
    n = n+i;
    i++;
    return f(n);
}
```

The value returned by  $f(1)$  is:

- A. 5      B. 6      C. 7      D. 8

gatecse-2004   programming   programming-in-c   recursion   easy   isro2008

[Answer key](#)

### 32.12.2 Recursion: ISRO2018-69 [top](#)



Let  $P$  be a procedure that for some inputs calls itself (i.e. is recursive). If  $P$  is guaranteed to terminate, which of the following statement(s) must be true?

- I.  $P$  has a local variable
  - II.  $P$  has an execution path where it does not call itself
  - III.  $P$  either refers to a global variable or has at least one parameter
- a. I only      b. II only      c. III only      d. II and III only

isro2018   programming   recursion

[Answer key](#)

## 32.13

### Semantic Analysis (1) [top](#)



#### 32.13.1 Semantic Analysis: ISRO2018-10 [top](#)

Which of the following comparisons between static and dynamic type checking is incorrect?

- a. Dynamic type checking slows down the execution
- b. Dynamic type checking offers more flexibility to the programmers
- c. In contrast to Static type checking, dynamic type checking may cause failure in runtime due to type errors
- d. Unlike static type checking dynamic type checking is done during compilation

isro2018   programming   semantic-analysis

[Answer key](#)

## 32.14

### Union (1) [top](#)





Consider the following C declaration:

```
struct {
    short x[5];
    union {
        float y;
        long z;
    } u;
}t;
```

Assume that the objects of the type short, float and long occupy 2 bytes, 4 bytes and 8 bytes, respectively. The memory requirement for variable *t*, ignoring alignment consideration, is:

- A. 22 bytes      B. 14 bytes      C. 18 bytes      D. 10 bytes

gatecse-2000   programming   programming-in-c   easy   isro2015   union

[Answer key](#)

## Answer Keys

32.0.1	X	32.0.2	X	32.0.3	D	32.0.4	C	32.0.5	D
32.0.6	B	32.0.7	A	32.1.1	C	32.2.1	B	32.2.2	C
32.2.3	B	32.3.1	A	32.4.1	B	32.5.1	B	32.6.1	A
32.7.1	A	32.7.2	A	32.8.1	A	32.9.1	B	32.10.1	D
32.10.2	A	32.10.3	C	32.11.1	C	32.11.2	B	32.11.3	C
32.11.4	B	32.11.5	D	32.11.6	D	32.11.7	B	32.11.8	D
32.11.9	D	32.11.10	B	32.11.11	C	32.11.12	A	32.11.13	X
32.11.14	A	32.11.15	D	32.11.16	D	32.11.17	C	32.11.18	B
32.11.19	C	32.11.20	B	32.11.21	D	32.11.22	D	32.12.1	C
32.12.2	D	32.13.1	D	32.14.1	C				

33.0.1 ISRO2016-32 [top](#)

AN FSM(finite state machine) can be considered to be a turing machine of finite tape length

- A. without rewinding capability and unidirectional tape movement
- B. rewinding capability and unidirectional tape movement
- C. without rewinding capability and bidirectional tape movement
- D. rewinding capability and bidirectional tape movement

theory-of-computation isro2016

[Answer key](#)

33.0.2 ISRO2020-40 [top](#)

Which of the following classes of languages can validate an IPv4 address in dotted decimal format? It is to be ensured that the decimal values lie between 0 and 255.

- |                   |                                    |
|-------------------|------------------------------------|
| A. RE and higher  | B. CFG and higher                  |
| C. CSG and higher | D. Recursively enumerable language |

isro-2020 theory-of-computation normal

[Answer key](#)

## 33.1

Closure Property (2) [top](#)33.1.1 Closure Property: ISRO2017-77 [top](#)

If  $L$  and  $P$  are two recursively enumerable languages then they are not closed under

- |                             |                            |
|-----------------------------|----------------------------|
| A. Kleene star $L^*$ of $L$ | B. Intersection $L \cap P$ |
| C. Union $L \cup P$         | D. Set difference          |

isro2017 set-theory theory-of-computation recursive-and-recursively-enumerable-languages closure-property

[Answer key](#)

33.1.2 Closure Property: ISRO2018-25 [top](#)

$CFG$  (Context Free Grammar) is not closed under:

- a. Union
- b. Complementation
- c. Kleene star
- d. Product

isro2018 closure-property context-free-language theory-of-computation

[Answer key](#)

## 33.2

Context Free Grammar (2) [top](#)

### 33.2.1 Context Free Grammar: ISRO2018-27 [top](#)



A *CFG* (Context Free Grammar) is said to be in Chomsky Normal Form (*CNF*), if all the productions are of the form  $A \rightarrow BC$  or  $A \rightarrow a$ . Let  $G$  be a *CFG* in *CNF*. To derive a string of terminals of length  $x$ , the number of products to be used is:

- a.  $2x - 1$
- b.  $2x$
- c.  $2x + 1$
- d.  $2^x$

isro2018 context-free-grammar theory-of-computation

[Answer key](#)

### 33.2.2 Context Free Grammar: ISRO2020-39 [top](#)



The language which is generated by the grammar  $S \rightarrow aSa \mid bSb \mid a \mid b$  over the alphabet of  $\{a, b\}$  is the set of

- A. Strings that begin and end with the same symbol
- B. All odd and even length palindromes
- C. All odd length palindromes
- D. All even length palindromes

isro-2020 theory-of-computation context-free-grammar normal

[Answer key](#)

## 33.3

### Context Free Language (2) [top](#)



$$S \rightarrow aSa \mid bSb \mid a \mid b$$

The language generated by the above grammar over the alphabet  $\{a, b\}$  is the set of:

- A. all palindromes
- B. all odd length palindromes
- C. strings that begin and end with the same symbol
- D. all even length palindromes

gatecse-2009 theory-of-computation context-free-language easy isro2016

[Answer key](#)

### 33.3.2 Context Free Language: ISRO2020-37 [top](#)



Context free languages are closed under

- A. union, intersection
- B. union, kleene closure
- C. intersection, complement
- D. complement, kleene closure

isro-2020 theory-of-computation context-free-language easy

[Answer key](#)

## 33.4

### Context Sensitive (1) [top](#)



#### 33.4.1 Context Sensitive: ISRO2017-11 [top](#)

Given the following statements

- S1 : Every context-sensitive language  $L$  is recursive
- S2 : There exists a recursive language that is not context-sensitive

Which statements are true?

- A. Only S1 is correct  
 C. Both S1 and S2 are not correct  
 B. Only S2 is correct  
 D. Both S1 and S2 are correct

isro2017 theory-of-computation context-sensitive

[Answer key](#)

33.5

Finite Automata (3) [top](#)

#### 33.5.1 Finite Automata: ISRO2014-2 [top](#)



The number of states required by a Finite State Machine, to simulate the behavior of a computer with a memory capable of storing ' $m$ ' words, each of length ' $n$ ' bits is?

- A.  $m \times 2^n$       B.  $2^{m+n}$       C.  $2^{mn}$       D.  $m + n$

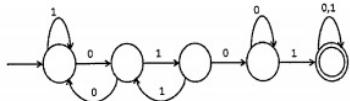
theory-of-computation finite-automata isro2014

[Answer key](#)

#### 33.5.2 Finite Automata: ISRO2014-79 [top](#)



Consider the following Deterministic Finite Automaton  $M$ .



Let  $S$  denote the set of eight bit strings whose second, third, sixth and seventh bits are 1. The number of strings in  $S$  that are accepted by  $M$  is

- A. 0      B. 1      C. 2      D. 3

isro2014 theory-of-computation finite-automata

[Answer key](#)

#### 33.5.3 Finite Automata: ISRO2020-41 [top](#)



Minimum number of states required in DFA accepting binary strings not ending in "101" is

- A. 3      B. 4      C. 5      D. 6

isro-2020 theory-of-computation finite-automata normal

[Answer key](#)

33.6

Grammar (3) [top](#)

### 33.6.1 Grammar: ISRO2008-7 [top](#)



Consider the grammar

- $S \rightarrow ABCc \mid bc$
- $BA \rightarrow AB$
- $Bb \rightarrow bb$
- $Ab \rightarrow ab$
- $Aa \rightarrow aa$

Which of the following sentences can be derived by this grammar?

- A. abc      B. aab      C. abcc      D. abbc

isro2008 theory-of-computation context-free-language grammar

[Answer key](#)

### 33.6.2 Grammar: ISRO2011-68 [top](#)



Which of the following sentences can be generated by

$$\begin{aligned} S &\rightarrow aS \mid bA \\ A &\rightarrow d \mid cA \end{aligned}$$

- A. bccdd      B. abbcca      C. abcabc      D. abcd

isro2011 theory-of-computation context-free-language grammar

[Answer key](#)

### 33.6.3 Grammar: ISRO2016-38 [top](#)



What is the highest type number that can be assigned to the following grammar?

$$S \rightarrow Aa, A \rightarrow Ba, B \rightarrow abc$$

- A. Type 0      B. Type 1      C. Type 2      D. Type 3

theory-of-computation grammar isro2016

[Answer key](#)

## 33.7

### Identify Class Language (1) [top](#)



#### 33.7.1 Identify Class Language: ISRO2018-24 [top](#)

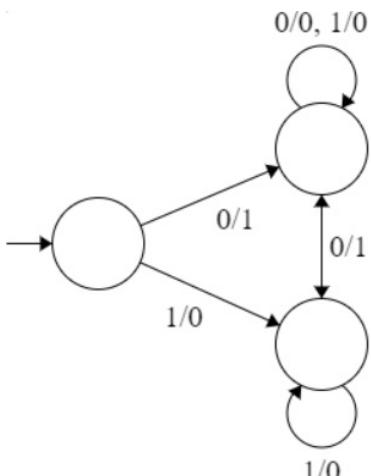
Choose the correct statement -

- a.  $A = \{a^n b^n \mid n = 1, 2, 3, \dots\}$  is a regular language
- b. The set  $B$ , consisting of all strings made up of only  $a's$  and  $b's$  having equal number of  $a's$  and  $b's$  defines a regular language
- c.  $L(A^*B) \cap B$  gives the set  $A$
- d. None of the above

**Answer key****33.8****Minimal State Automata (1)****33.8.1 Minimal State Automata: ISRO2014-12**

How many states are there in a minimum state deterministic finite automaton accepting the language  $L = \{w \mid w \in \{0,1\}^*, \text{ number of } 0's \text{ is divisible by } 2 \text{ and number of } 1's \text{ is divisible by } 5, \text{ respectively }\}$ ?

- A. 7      B. 9      C. 10      D. 11

**Answer key****33.9****Moore Mealy Machine (1)****33.9.1 Moore Mealy Machine: ISRO2018-26**

The *FSM* (Finite State Machine) machine pictured in the figure above

- |  |  |
|--|--|
| A. Complements a given bit pattern     | B. Finds $2's$ complement of a given bit pattern |
| C. Increments a given bit pattern by 1 | D. Changes the sign bit                          |

**Answer key****33.10****Non Determinism (1)****33.10.1 Non Determinism: GATE CSE 2009 | Question: 16, ISRO2017-12**

Which one of the following is FALSE?

- A. There is a unique minimal DFA for every regular language
- B. Every NFA can be converted to an equivalent PDA.
- C. Complement of every context-free language is recursive.

D. Every nondeterministic PDA can be converted to an equivalent deterministic PDA.

gatecse-2009 theory-of-computation easy isro2017 non-determinism

Answer key 

33.11

## Recursive And Recursively Enumerable Languages (2) [top](#)

33.11.1 Recursive And Recursively Enumerable Languages: GATE CSE 2008 | Question: 13, ISRO2016-36 [top](#) 

If  $L$  and  $\overline{L}$  are recursively enumerable then  $L$  is

- A. regular
- B. context-free
- C. context-sensitive
- D. recursive

gatecse-2008 theory-of-computation easy isro2016 recursive-and-recursively-enumerable-languages

Answer key 

33.11.2 Recursive And Recursively Enumerable Languages: ISRO2011-79 [top](#) 

A problem whose language is recursion is called?

- A. Unified problem
- B. Boolean function
- C. Recursive problem
- D. Decidable

isro2011 theory-of-computation recursive-and-recursively-enumerable-languages

Answer key 

33.12

## Regular Expression (2) [top](#)

33.12.1 Regular Expression: GATE CSE 1995 | Question: 1.9 , ISRO2017-13 [top](#) 

In some programming language, an identifier is permitted to be a letter followed by any number of letters or digits. If  $L$  and  $D$  denote the sets of letters and digits respectively, which of the following expressions defines an identifier?

- A.  $(L + D)^+$
- B.  $(L \cdot D)^*$
- C.  $L(L + D)^*$
- D.  $L(L \cdot D)^*$

gate1995 theory-of-computation regular-expression easy isro2017

Answer key 

33.12.2 Regular Expression: ISRO2016-33 [top](#) 

Let  $L = \{w \in (0 + 1)^* \mid w \text{ has even number of } 1's\}$ , i.e.  $L$  is the set of all bit strings with even number of 1's. Which one of the regular expression below represents  $L$ ?

- A.  $(0^* 1 0^*)^*$
- B.  $0^* (1 0^* 1 0^*)^*$
- C.  $0^* (1 0^* 1^*)^* 0^*$
- D.  $0^* 1 (1 0^* 1)^* 1 0^*$

theory-of-computation regular-expression isro2016

Answer key 

33.13

## Regular Language (2) [top](#)

33.13.1 Regular Language: ISRO2015-43 top



Let  $R_1$  and  $R_2$  be regular sets defined over the alphabet, then

- A.  $R_1 \cap R_2$  is not regular      B.  $R_1 \cup R_2$  is not regular  
C.  $\Sigma^* - R_1$  is regular      D.  $R_1^*$  is not regular

isro2015 theory-of-computation regular-language

## Answer key

### 33.13.2 Regular Language: ISRO2020-38



Which of the following is true?

- A. Every subset of a regular set is regular
  - B. Every finite subset of non-regular set is regular
  - C. The union of two non regular set is not regular
  - D. Infinite union of finite set is regular

isro-2020 theory-of-computation regular-language easy

## Answer key

33.14

## Turing Machine (1) top

33.14.1 Turing Machine: ISRO2014-59 top



Which of the following is FALSE with respect to possible outcomes of executing a Turing Machine over a given input?

- A. it may halt and accept the input
  - B. it may halt by changing the input
  - C. it may halt and reject the input
  - D. it may never halt

isro2014 theory-of-computation turing-machine

## Answer key

# Answer Keys

33.0.1	A	33.0.2	A	33.1.1	D	33.1.2	B	33.2.1	A
33.2.2	C	33.3.1	B	33.3.2	B	33.4.1	D	33.5.1	C
33.5.2	C	33.5.3	B	33.6.1	X	33.6.2	D	33.6.3	D
33.7.1	D	33.8.1	C	33.9.1	X	33.10.1	D	33.11.1	D
33.11.2	D	33.12.1	C	33.12.2	B	33.13.1	C	33.13.2	B
33.14.1	B								